The scope of finance

Topic 1

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Introduction

Imagine you want to start operating a new business. A simple way to look at your business initially is to think of it as a pool of cash. Cash flows will come into this pool from a variety of sources, e.g.:

- investors (who therefore become the owners);
- financiers providing short-term and long-term cash loans; and
- customers who buy from the business and pay cash.

This available cash can then be used for:

- purchasing fixed assets such as buildings and machinery;
- purchasing inventory necessary to operate the business and making payments to suppliers who have supplied the firm with products or services;
- investing in short-term and long-term interest-earning securities;
- paying interest and principal to the firm's financiers; and
- returning profits to the owners of the business.

It is easy to see that most businesses have a continual flow of cash into, around and out of them. Our study of finance is basically the study of this flow of cash, or put another way, it is about managing the money that goes into and out of the business.

More specifically it is about investing and managing assets (both short and long term), and financing those assets. It is about questions like what do you want to buy and why? How much do you want to pay and why? Should we use borrowed money or should we use the owner's capital and why? If we use borrowed money (or debt), should it be short term or long term? Should it be at a variable or fixed interest rate? What financial product (e.g. bank overdraft or term loan) should we use and why?

It's worth reading the following passage to get a further insight into what finance is and why the study of finance is important to business.

Financial management—A business perspective

Dr Robert Pamplin, Jr—President, R.B. Pamplin Corp.

Business today is based on financial understanding. Knowledge of finance reveals how a company operates and the policies it uses, so you can properly interpret its financial statements and better understand management's investment and financing decisions. Financial information also provides feedback; it shows how well you have done and helps to isolate problems. Therefore, it's very important that all managers—even those in information systems, marketing, and operations—have a working knowledge of financial management and its implications for business.

R.B. Pamplin Corporation is a fast-growing private company with $835 million in sales from textiles and concrete and asphalt subsidiaries. Our financial managers work closely with other areas of the firm. In fact, finance is the glue that connects departments. Imagine if production managers at one of our denim plants decided what to make without knowing what customers wanted, or if salespeople sold the fabric at a price below the cost of its raw materials. With input from finance bridging the gap between sales and production, our managers make decisions that contribute to the firm's profitability.

Our philosophy of financial management emphasizes maximizing value over the long term for our shareholders and our stakeholders—employees, customers, suppliers, community. As a private company, we don't have to worry about showing a profit every quarter. But all companies should make financial and operating decisions with a view toward the long term. Too much focus on the short term is dangerous.

Take, for example, a proposal to buy new equipment. In the short run, the purchase reduces earnings by increasing depreciation. But benefits such as lower production costs and higher output may increase the company's value to both investors and stakeholders in the long term. A more efficient company is more competitive and supplies the customer with the lowest cost, highest quality product. This, in turn, ensures the company's future profitability—which translates to job security for our employees and their communities, because we donate 10 percent of our before tax profit to various community projects.

But all three types of financial decisions—capital investment, financing, and day to day operations—are important. You can build a state-of-the-art plant to produce a high volume of your product. But if you didn't finance it appropriately or price the product to make a profit, the plant is worthless. Unless you focus on the big picture, you won't succeed.

Robert B. Pamplin, Jr., President of R.B. Pamplin Corporation, is also majority owner of retailing, video productions, recording, and farming companies. The author of American Heroes, he has B.S. degrees in Accounting, Economics, and Business from Lewis & Clark University, an M.B.A. from the University of Portland, and a Ph.D. in Theology from Western Seminary.

Source: Gitman 1997, p. 3.

In this topic we will examine how corporate finance has developed and where financial managers fit into the organisation. We will review the decisions that financial managers make, and the forms of business (sole proprietor, partnership and company) that can be utilised. We will also examine the underlying goal of the firm (and other possible goals), and the interrelationship between this goal and the field of finance. We will then explore the concept of 'agency', or managers acting as 'agents' for the owners of the firm. Finally, we will look briefly at the financial environment in which businesses operate.

Objectives

At the completion of this topic, you should be able to:

- identify the concerns of finance;
- describe the development of finance as a discipline;
- critically assess the corporate goal which underlies the theory of finance;
- outline the types of business entities;

- explain the agency problem; and
- discuss the financial environment in which businesses operate.

Learning resources

Textbook

Ross, S.A., Westerfield, R.W. & Jordan, B.D. 2000
Fundamentals of Corporate Finance
5th edn, Irwin McGraw-Hill, Boston, chapters 1 and 2.

Readings

Long, S. 1998
'Company focus falls short'
Australian Financial Review
3 Dec., p. 9.

Lyons, M. 1994
'CFOs watch more than the figures'
Business Review Weekly
12 Sept., pp. 110–11.

Key concepts

The following key concepts are introduced and developed in this topic:

- finance;
- financial manager;
- financial management decisions;
- forms of business organisation (sole proprietorship, partnership and company);
- the goal of financial management being the maximisation of the market price of the ordinary shares of the firm;
- agency; and
- primary and secondary markets.

The evolution of finance

Finance as a discipline has had a relatively short history, virtually being confined to this century. Its origins lie in accounting and economics, particularly microeconomics. Until the early 1950s, finance was largely confined to a description of why funds were needed in a business and how they could be raised. There has been, however, a remarkable change in the orientation of finance as a discipline in the past five decades.

There have also been large fluctuations in the business environment in the last 50 years. We have gone from a period of low inflation to high inflation and now back to low inflation. Similarly, we have gone from a period of low interest rates to very high interest rates and back down to relatively low interest rates. At the same time as the high interest rates, we saw an almost carefree attitude towards borrowing, but now bankers are much more cautious in their lending policies.

We have also seen:

- rapid changes in economic growth patterns;
- staggering technological change altering many firms' capital-to-labour ratios;
- the increasing importance of international operations and the need to plan and manage globally (including managing interest rates and exchange-rate risks); and
- the introduction of a capital gains tax and dividend imputation system in Australia.

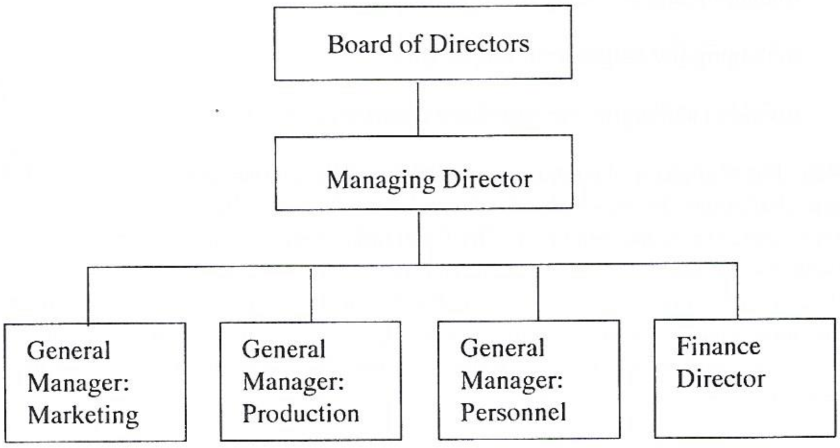
As a result of these developments, the role of the financial manager has changed; the financial manager cannot rely on old and trusted approaches to financial problems. Fifty or so years ago, financial managers had relatively simple roles to play in any business enterprise. They were responsible for obtaining the best balance of finance for the firm at the lowest possible cost from a relatively limited range of financial institutions and forms of finance in a stable business environment.

In the following section we will examine the roles and responsibilities of the financial manager in the current financial and economic environment.

Financial management and the financial manager

Financial managers are employed by the owners of larger organisations (called shareholders—or stockholders—because they hold shares [or stock] in the company) to look after their interests and manage the day-to-day financial affairs of the business. Look at the simplified organisational chart in Figure 1.1 to see where the financial manager (or the more up-market name of 'Finance Director' or 'General Manager—Finance') fits into the structure of the organisation.

Figure 1.1: Simple organisational chart


Board of Directors
Managing Director
General Manager: Marketing
General Manager: Production
General Manager: Personnel
Finance Director

At the top of the organisational chart is a Board of Directors which is ultimately responsible for the well-being and success of the company. Then follows a Managing Director who is responsible to the Board, with a Finance Director responsible to the Managing Director. We will use the general term 'Financial Manager' (rather than 'Finance Director') which is consistent with Ross et al. (2000) in this unit to refer to the person or persons who are significantly responsible for the company's investment and financing decisions from now on. We will not go into the accounting and internal audit roles of the financial manager in this unit but we will spend considerable time on the investment and financing decisions that a financial manager has to make.

The role of the financial manager

Generally speaking, the financial manager will be actively involved in selecting appropriate investment opportunities. They should be capable of determining how much should be paid for various investments and what investments are likely to add value to the firm. The techniques the financial manager might employ in choosing appropriate investment opportunities are discussed in a later topic.

The financial manager should also be involved in managing existing assets more efficiently, both shorter term assets like cash, debtors and inventory and, of course, the longer term assets of property, plant and equipment. We will, however, limit our discussion in this subject to managing the longer term assets.

The finance manager should be aware of the framework of financial institutions and financial instruments available in Australia, and overseas, and the products that are available to be used by businesses.

The finance manager should also have an input into determining the best financial mix of debt and equity (known as capital structure) for the firm.

In summary, the statement of duties and responsibilities of the financial manager includes overseeing the following:

- long-term capital investment evaluations and decisions;

- negotiating long-term and short-term finance;
- managing and servicing borrowings;
- managing the longer term assets; and
- dividend and equity remuneration recommendations.

Note that changes in the business environment have created new demands and new challenges. Increasingly, the financial manager has been thrust into a more general management role. The financial manager is now responsible for ensuring that the firm has the most desirable level of funds and the most efficient allocation of those funds within the firm. The financial manager must also have human resources skills, not only to manage those for whom he or she is responsible, but also to ensure that financial recommendations are fully understood by others in the business.

Reading

Please read the introduction to Chapter 1 and 'Corporate Finance and the Financial Manager' (Section 1.1) in Ross et al. 2000, pp. 2–5.

Reading

Please read Lyons 1994, 'CFOs watch more than the figures', for a further general discussion on the role of chief financial officers (CFOs).

Exercise 1.1

Using the above 'statement of duties and responsibilities' for the financial manager, identify who in your organisation is responsible for each of those 'areas' listed.

Talk to those people responsible and find out a little about what they actually do.

Forms of business organisation

Most business entities are structured as:

- sole proprietorships (owned by one person);
- partnerships (owned by two or more people); or
- companies (separate legal entities formed under the Corporations Law).

(There are other less common entities such as discretionary trusts and unit trusts but we will not consider these here.)

Reading

Please read 'Forms of business organization' (Section 1.2) in Ross et al. 2000, pp. 5–8, to understand the types of business entities that exist.

Sole proprietorships

The sole proprietorship is a business run by one person where the debts of the business are the personal debts of the operator (i.e. it is not a separate legal entity). Similarly, the net profit of the business is the net profit of the individual which is then taxable in the hands of the individual. Compliance costs, or the costs of complying with laws, are minimal for the sole proprietor and certainly the least of all the business forms. This business form is also the least costly to set up and run. Note that in Australia you don't even need to get a 'business licence' as stated in Ross et al. (2000, p. 6); you can just start a business. (If you want to operate under a 'business name' you must then apply for registration of that business name with the various state or provincial authorities that handle this.

Partnership

The major difference between the sole proprietor and the partnership is simply the number of owners involved in the business. Two or more owners constitute a partnership. Normally partnerships consist of up to 20 people but legal and accounting partnerships comprise many more. Once again, the debts of the business are the debts of the owners or partners (jointly and severally—meaning as a group or as individuals), and the profits of the business become the taxable profits of the individual partners. Again, this business form is not costly to set up and run. *Limited partnerships* have only been operating in Australia for a very short while. This form of partnership limits the liability of the limited partners who do not participate in the operation of the business, but the liability of the *general partner* is still unlimited.

Companies (or corporations)

A company, or corporation, is a separate legal entity which, although physically invisible and intangible, exists in the contemplation of the law. Note also that the owner's (or shareholder's) liability is limited to the amount of capital contributed by way of shares purchased which are the units of interest in the company. The 'by-laws' mentioned in Ross et al. (2000, p. 7), commonly called the articles of association in Australia, are not a separate document. The other differences between Australian companies (or corporations) and US corporations are that Australian companies may not have their dividends taxed twice as is suggested in Ross et al. (2000, p. 8) because of the system of dividend imputation in this country (we will discuss this in more detail later on in this unit), and in Australia we do not have LLCs (limited liability companies) or S corporations (a special type of small corporation) (p. 8).

There are various regulatory authorities in countries around the world that monitor and regulate the activities of companies within that country. In the United States, they have a Securities and Exchange Commission (SEC). In Hong Kong, they have a Securities and Futures Commission (SFC).

In Australia, there are over 1 000 000 companies whose activities are monitored and regulated by the Australian Securities and Investments Commission (ASIC). You should also note that in Australia we have two basic categories of company—*private companies* and *public companies*. The essential difference between the two is that private companies cannot 'invite' the public at large to subscribe for shares, while public companies can.

Exercise 1.2

Do you work in a business organisation (sole proprietorship, partnership or company) or do you work in a government department?

If you work in a business organisation, examine why your organisation has adopted the business form that it has.

If you work for a government department, identify how your organisation is different to the three basic forms of business organisations.

Goals of the firm

In practice, firms may pursue a number of goals like 'profit maximisation' or 'maximisation of earnings per share', but the goal that has been selected and that finds almost universal acceptance in the field of finance is maximisation of the market price of the ordinary shares of a company or, in short, maximising shareholder wealth. This is a single, overriding goal which the subject matter of finance assumes all firms should attempt to achieve.

Reading

Please read 'The goal of financial management' (Section 1.3) in Ross et al. 2000, pp. 9–11, for an introductory discussion of some basic concepts regarding company goals. Detailed note-taking is not required.

It is worth focusing on the reason for the goal of 'maximisation of shareholder wealth'. Van Horne et al. (1995, p. 9) justify the choice of this goal in the following quotation:

> The market price of a company's shares represents the focal judgement of all market participants as to the value of the particular company. It takes into account present and prospective future earnings per share, the timing, duration, and risk of these earnings, the dividend policy of the company and other factors that bear upon the market price of the stock. The market price serves as a barometer for business performance. It provides the best indicator of how well management is doing on behalf of its shareholders, although it is not a perfect indicator due to the influence of factors outside management's control.

Reading

Please read Long 1998, 'Company focus falls short', which suggests that companies should focus on the value of the contribution of their employees. What do you think?

Exercise 1.3

Make a list of goals that firms may follow. Can you think of possible reasons why the goals you have listed have not been preferred to the maximisation of the market price of the ordinary share?

A further reason for selecting the maximisation of the market price of the ordinary share as the goal of the firm is that it is claimed it will lead to optimal allocation of resources within the total economy. This is because more resources are applied to those firms that use resources more efficiently, and firms that can maximise share price are more likely to be using their resources more efficiently than those firms not maximising share price.

Fletcher Challenge raises shareholder wealth

Fletcher Challenge Limited has historically been associated with the forestry sector in New Zealand, Chile and Canada. Although a large proportion of its assets are connected with pulp and paper and forestry it also has significant building and energy investments. By April 1996 the company had split itself into four firms, each trading shares on the share market.

The primary motivation behind splitting Fletcher Challenge into four different shares was to enhance shareholder value. Fletcher Challenge's management had for a number of years complained that the New Zealand and Australian share markets were not valuing their shares properly. In particular, management believed that its energy and building activities were not being correctly valued as investors tended to view the company primarily as a pulp and paper company, and therefore its share price closely followed the fortunes of the world pulp and paper prices. Management believed that splitting the company would create greater transparency of each of its core activities (energy, paper and building) which would lead to more appropriate valuations of its share prices.

In the 18 months following the split, Fletcher Energy's share price has more than doubled and Fletcher Building has increased by over 40 per cent.

During the same period Fletcher Paper's share price has wallowed as it continues to mirror pulp and paper price fluctuations.

Source: Gitman et al. 1998, p. 19.

The agency problem and control of the corporation

As we have already suggested, in larger organisations the owners or shareholders appoint professional managers to manage the activities of the business and to look after the interests of the owners. Can there be any conflict of interests between these owners and managers that obstruct the goal of maximising the wealth of the owners? The following reading from Ross et al. discusses this question.

Reading

Please read 'The agency problem and control of the corporation' (Section 1.4) in Ross et al. 2000, pp. 12–15. You should take note of what the concepts of agency and the agency problem mean, and the definition of 'stakeholder'.

Exercise 1.4

Is there an economic justification for requiring businesses to alter their activities if they are perceived to be socially irresponsible? Should it be the responsibility of government to enact legislation to prevent specific anti-social activities?

Exercise 1.5

Is there any potential conflict for management in pursuing the objective of maximising the market price of the ordinary share on the one hand and their own self-interest on the other? What implications would such a

conflict have for the discipline of finance? Can you identify such conflict(s) in your own organisation?

Exercise 1.6

Complete 'Concepts review and critical thinking questions' 1, 5, 10, 11, 12, 13, 14 and 15 in Ross et al. 2000, pp. 19–20.

The financial environment within which companies operate

The decisions regarding the acquisition, financing and management of business assets are not made in isolation. Managers must therefore be aware of the financial environment in which they operate. In this section we will briefly examine the financial environment in which 'for profit' organisations must function.

Reading

Please read 'Financial markets and the corporation' (Section 1.5) in Ross et al. 2000, pp. 16–18.

Cash flows to and from the company

Companies use debt and equity (owners') funds to invest in short-term and long-term assets (see Figure 1.2 in Ross et al. 2000, p. 16). In exchange for these funds, the company issues 'securities' or documents showing that these providers of funds have a claim on the assets of the company. The company after investing these funds should then be able to pay interest and dividends to these debt and equity providers. During the year, the company must also pay stakeholders cash for services rendered or taxes to the government on profits made. The effect of direct or indirect taxation through various levels of government (federal, State and local) can have a major impact on financial decision-making and, ultimately, on the success or otherwise of businesses. It is therefore necessary for managers to have a basic understanding of the fundamentals of taxation.

Primary versus secondary markets

Primary markets are the markets where the initial debt or equity capital is raised, and the secondary market is where the original securities issued are then bought and sold by subsequent investors who want to have an interest in the company.

In Australia, we have an 'over the counter' market as referred to in Ross et al. (2000, p. 17) but we also have our own Australian Stock Exchange (ASX) where company shares can be listed and traded. There are various 'listing requirement' rules which need to be adhered to for the company to list and to maintain its listing, e.g. having a minimum of 300 shareholders, etc. We will examine the Australian capital market in more detail later in this unit.

(Note: The focus of this Study Guide and the prescribed textbook will be on corporations, particularly public and listed corporations. Public corporations (or public companies) are those that are able to invite and raise share capital from the public at large. Listed corporations are those that are 'listed' on the stock exchange and whose shares can be traded (bought and sold). There are over 1500 such public and listed companies on the Australian Stock Exchange.)

Reading

Please read 'Summary and conclusions' (Section 1.6) in Ross et al. 2000, pp. 18–19.

Financial reporting and analysis

We assume that most of you will have completed a unit in financial reporting and analysis in the course of your studies, so you should have a general appreciation of income statements (or profit and loss statements), balance sheets and cash flow statements. However, it is worth reading the following section from Ross et al. (2000) just to brush up on these areas.

Reading

Please read 'Cash flow' (Section 2.4) in Ross et al. 2000, pp. 31–8. You should take note of the following terms:

- **'Operating cash flow' is the earnings (profits) before interest and taxes, with the non-cash flow of depreciation added back and then the cash flow of taxes paid subtracted.**
- **'Net capital spending' is the amount spent on fixed assets less any cash received from the sale of fixed assets.**
- **The 'change in working capital' is the ending net working capital less the beginning net working capital. Net working capital can be defined as current assets less current liabilities.**
- **The 'cash flow to long-term providers' (note that Ross et al. 2000 use the expression creditors to mean long-term debt providers, where some of you may think of creditors being accounts payable) is the interest paid to these debt providers less any new long-term debt raised.**
- **The 'cash flow to stockholders or shareholders' is the dividends paid to them less any new share capital raised.**

Exercise 1.7

Complete 'Concepts review and critical thinking questions' 6, 7, 8 and 9 in Ross et al. 2000, p. 41.

Exercise 1.8

Complete 'Questions and problems' 22 in Ross et al. 2000, p. 44.

Summary

In this topic we initially discussed that finance is basically concerned with investing in assets, financing those assets and managing those assets. We went on to explore the idea that the corporate goal of 'maximising the wealth of the shareholders' should be of paramount importance to the finance manager and indeed to the board of any company.

We identified the basic types of business entity (sole proprietorship, partnership and company), and discussed the pros and cons of each. We discussed the problem of 'agency', or managers acting as agents of the owners and acting in the best interests of the owners rather than in their own interests. Finally, we briefly analysed the financial environment in which businesses operate.

Review questions

Complete the following multiple-choice test questions.

Review question 1.1

Financial manager

Which of the following is an answer to 'What are the duties of a financial manager?'

I deciding how much interest to pay the holders of the corporation's bonds

II deciding the mix of long-term debt and equity

III deciding which projects a firm should undertake

IV deciding how much short-term debt to use

- **(a) I and II only**
- **(b) I, II and III only**
- **(c) II and III only**
- **(d) II, III and IV only**
- **(e) I, II, III and IV**

Review question 1.2

Business organisations

Which of the following is an advantage of ownership of a corporation over that of a sole proprietorship?

- **(a) The owners of the corporation have unlimited liability for the firm's debt.**
- **(b) It is the simplest to start.**
- **(c) The corporation has an unlimited life.**
- **(d) Dividends received by the corporation's shareholders are tax-exempt.**
- **(e) It is more difficult to transfer ownership in a corporation.**

Financial management goal

Review question 1.3

Which of the following should be the goal of the financial manager of a corporation?

(a) to maximise the number of capital budgeting projects undertaken

(b) to maximise net income on the income statement

(c) to maximise current market value of the stock

(d) to maximise earnings per share

(e) to maximise market share while maintaining steady earnings growth

Agency costs

Review question 1.4

Which of the following is a type of agency cost?

(a) the cost of an audit of the firm's financial statements

(b) the cost of a corporate jet needed to keep tabs on foreign operations

(c) salaries paid to the firm's managers

(d) the costs of financing the firm

(e) the cost of buying insurance on the firm's assets

Financial management

Review question 1.5

A financial manager of a corporation is considering different operating strategies for the coming year. From a financial management standpoint, which of the following would be their optimal strategy?

(a) to undertake the plan that would reduce the overall riskiness of the firm

(b) to undertake the plan that would maximise the current stock price

(c) to undertake the plan that would result in the largest profits for the year

(d) to undertake the plan that would maximise the financial manager's personal wealth

(e) to undertake the plan that would lead to the most stable stock price for the year

Markets

Review question 1.6

The secondary market is:

(a) the market for the original sale of securities by governments and corporations

(b) the market by which dealers buy and sell for themselves, at their own risk

(c) the market in which purchasers are matched with those who wish to sell

(d) a market that has no central location

(e) the market in which securities are bought and sold after original sale

Review question 1.7

Business organisations

The death of the firm's owner(s) does *not* effectively dissolve which type(s) of organisation?

I sole proprietorship

II partnership

III corporation

- **(a) I only**
- **(b) II only**
- **(c) III only**
- **(d) I and III only**
- **(e) II and III only**

Review question 1.8

Accounting profit and cash flows

Solski Inc., a maker of flea collars, paid $75 000 cash for inventory on 1 January, 1995. On 31 December 1995, the entire inventory had been sold. The company's sales orders totalled $97 000 and, of that, $42 000 had been collected. If inventory represents Solski's only cost, calculate the firm's accounting profit and its cash flow as of 31 December. Assume no taxes.

(a) $33 000; $42 000

(b) $33 000; – $42 000

(c) $22 000; – $33 000

(d) – $22 000; $42 000

(e) – $22 000; – $33 000

Review question 1.9

Net working capital

Total assets = $550, fixed assets = $375, current liabilities = $140, equity = $265, and long-term debt = $145. If the only item missing from the balance sheet is current assets, what is the value of net working capital?

(a) – $265

(b) $35

(c) $190

(d) $230

(e) $265

Review question 1.10

Cash flows to stockholders

Cash flow to stockholders is:

(a) equal to total cash flow from assets minus cash flow to creditors

(b) equal to sales of equity plus cash dividends paid

(c) equal to operating cash flow minus additions to net working capital minus net capital spending

(d) equal to cash dividends minus repurchases of equity plus new equity sold

(e) usually greater than cash flow to creditors

Review question 1.11

Operating cash flow

From the following income statement information, calculate operating cash flow. Net sales = $16 500; cost of goods sold = $10 350; operating expenses = $3118; depreciation = $1120; interest expense = $900; tax rate = 34%.

(a) $667.92

(b) $1912.00

(c) $2201.12

(d) $2381.92

(e) $2687.92

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Suggested answers

Topic 1

Exercises

Exercise 1.3

It is possible, if you think for a moment, to develop quite a list of possible goals of the firm. Some of the more obvious include:

- maximisation of profits;
- maximisation of sales;
- a satisfactory level of profits;
- survival of the firm; and
- a specific market share.

If you are more cynical you may have considered the following goals:

- no ulcers for management;
- maximisation of managerial salaries; and
- maximisation of managerial fringe benefits.

Maximisation of profits is sometimes suggested as a goal; however, it is deemed to be unsatisfactory for a number of reasons. First, the precise meaning of profits is unclear. For example, are we discussing long-term profits, short-term profits, total profits, profits per share, gross profit, net profit before tax or net profit after tax? Secondly, the concept makes no specific mention of the time value of money (i.e. money received today is more valuable than money to be received in 10 years as it can be reinvested and earn interest). Finally, maximisation of profits ignores the important question of risk. Strictly speaking, a firm adopting this goal would prefer a high-risk project which earns more profits than a low-risk project, even when the difference in profits is quite small.

Exercise 1.4

These are subjective and controversial questions. I will only provide arguments for and against, allowing you to contemplate where you stand on the issue.

United States economist Milton Friedman is a strong advocate of the view that business should not be socially responsible to the whole community, but should seek to maximise wealth for its owners within the rules set by government. He writes:

> In such an economy [free enterprise], there is one and only one social responsibility of business—to use its resources and engage in activities designed to increase its profits so long as it stays within the rules of the game, which is to say, engages in open and free competition, without deception or fraud.

Source: Friedman 1962, p. 133.

Robert N. Anthony (1960, p. 133) has a different view. He wrote that a business person is 'a human being', and that it is unrealistic to assume that they would act 'in an ethical vacuum'. They are deeply concerned with how their 'actions jibe' with their own conscience, the respect of their family and the opinions of their associates:

> Moral standards change, and whereas 50 or 100 years ago the profit maximising managers would perhaps have been tolerated in some circles of some communities, today society clearly expects … [business people] to act responsibly.

Source: Anthony 1960, p. 133.

Exercise 1.5

It should be pointed out that there is not necessarily a conflict between social responsibility and the maximisation of share price. Socially responsible actions by companies can improve the public image of a company and may increase the company's share price.

It should not be assumed that if a manager acts in self-interest, this will necessarily be in conflict with the goal of maximisation of the company's share price. Managers, for example, may actively seek to increase the share price of their companies in the hope of increasing their own salaries and to prevent any possible takeovers.

If a manager is required to own shares in the company, then that may very well affect his or her actions to the detriment of the company's share price. A manager who own shares in a company may avoid risky projects entirely.

Exercise 1.6

1. Capital budgeting (deciding on whether to expand a manufacturing plant), capital structure (deciding whether to issue new equity and use the proceeds to retire outstanding debt), and working capital management (modifying the firm's credit collection policy with its customers).

5. To maximise the current market value (share price) of the equity of the firm (whether it's publicly traded or not).

10. Presumably, the current stock value reflects the risk, timing, and magnitude of all future cash flows, both short term *and* long term. If this is correct, then the statement is false.

11. An argument can be made either way. At the one extreme, we could argue that in a market economy, all of these things are priced. There is thus an optimal level of, for example, ethical and/or illegal behaviour, and the framework of stock valuation explicitly includes these. At the other extreme, we could argue that these are non-economic phenomena and are best handled through the political process. A classic (and highly

relevant) question that illustrates this debate goes something like this: 'A firm has estimated that the cost of improving the safety of one of its products is $30 million. However, the firm believes that improving the safety of the product will only save $20 million in product liability claims. What should the firm do?'

12. The goal will be the same, but the best course of action toward that goal may be different because of differing social, political, and economic institutions.

13. The goal of management should be to maximise the share price for the current shareholders. If management believes that it can improve the profitability of the firm so that the share price will exceed $35, then they should fight the offer from the outside company. If management believes that this bidder or other unidentified bidders will actually pay more than $35 per share to acquire the company, then they should still fight the offer. However, if the current management cannot increase the value of the firm beyond the bid price, and no other higher bids come in, then management is not acting in the interests of the shareholders by fighting the offer. Since current managers often lose their jobs when the corporation is acquired, poorly monitored managers have an incentive to fight corporate takeovers in situations such as this.

14. We would expect agency problems to be less severe in countries other than the USA, primarily due to the relatively small percentage of individual ownership. Fewer individual owners should reduce the number of diverse opinions concerning corporate goals. The high percentage of institutional ownership might lead to a higher degree of agreement between owners and managers on decisions concerning risky projects. In addition, institutions may be better able to implement effective monitoring mechanisms on managers than can individual owners, based on the institutions' deeper resources and experiences with their own management. The increase in institutional ownership of stock in the United States and the growing activism of these large shareholder groups may lead to a reduction in agency problems for US corporations and a more efficient market for corporate control.

15. How much is too much? Who is worth more, Jack Welch or Tiger Woods? The simplest answer is that there is a market for executives just as there is for all types of labour. Executive compensation is the price that clears the market. The same is true for athletes and performers. Having said that, one aspect of executive compensation deserves comment. A primary reason executive compensation has grown so dramatically is that companies have increasingly moved to stock-based compensation. Such movement is obviously consistent with the attempt to better align stockholder and management interests. In recent years, stock prices have soared, so management has cleaned up. It is sometimes argued that much of this reward is simply due to rising stock prices in general, not managerial performance. Perhaps in the future, executive compensation will be designed to reward only differential performance, i.e. stock price increases in excess of general market increases.

Exercise 1.7

6. For a successful company that is rapidly expanding, for example, capital outlays will be large, possibly leading to negative cash flow from assets. In general, what matters is whether the money is spent wisely, not whether cash flow from assets is positive or negative.

7. It's probably not a good sign for an established company, but it would be fairly ordinary for a start-up, so it depends.

8. For example, if a company were to become more efficient in inventory management, the amount of inventory needed would decline. The same might be true if it becomes better at collecting its receivables. In general, anything that leads to a decline in ending NWC relative to beginning would have this effect. Negative net capital spending would mean more long-lived assets were liquidated than purchased.

9. If a company raises more money from selling stock than it pays in dividends in a particular period, its cash flow to stockholders will be negative. If a company borrows more than it pays in interest, its cash flow to creditors will be negative.

Exercise 1.8

22. (a) Total assets 1998 = 475 + 2200 = $2675;
total liabilities 1998 = 205 + 1200 = $1405

Owners' equity 1998 = 2675 – 1405 = $1270

Total assets 1999 = 503 + 2300 = $2803;
total liabilities 1999 = 301 + 1400 = $1701

Owners' equity 1999 = 2803 – 1701 = $1102

(b) NWC 1998 = CA98 – CL98 = 475 – 205 = $270

NWC 1999 = CA99 – CL99 = 503 – 301 = $202

Change in NWC 1999 = NWC99 – NWC98 = 202 – 270 = – $68

(c) Net cap. sp. = NFA99 – NFA98 + D99 = 2300 – 2200 + 600 = $700

Net cap. sp. = fixed assets bought – fixed assets sold

700 = 1000 – fixed assets sold; fixed assets sold = 1000 – 700 = $300

OCF99 = EBIT + D – T = 2940 + 600 – 991.20

= 3540 – 991.20 = $2548.80

Cash flow from assets = OCF – inc. in NWC – inc. in cap. sp.

= 2548.80 + 68 – 700 = $1916.80

(d) Net new borrowing – LTD99 – LTD98 = 1400 – 1200 = $200

Cash flow to creditors = interest – net new LTD = 108 – 200 = – $92

Net new borrowing = 200 = debt issued – debt retired;
debt retired = 300 – 200 = $100

Review questions

Review question 1.1

Option (d)

Review question 1.2

Option (c)

Review question 1.3

Option (c)

Review question 1.4	Option (a)
Review question 1.5	Option (b)
Review question 1.6	Option (e)
Review question 1.7	Option (c)
Review question 1.8	Option (c)
Review question 1.9	Option (b)
Review question 1.10	Option (a)
Review question 1.11	Option (e)

Company focus falls short

Stephen Long

Source: Long, S. 1998, 'Company focus falls short', *Australian Financial Review,* 3 Dec., p. 9.

Companies are eroding their long-term sustainability because of an obsessive focus on shareholder value, costs and short-term returns, according to Mr Dick Carter, the former head of BHP's Iron Ore division.

'I am a strong believer that the world has gone mad in the way in which, and the intensity with which, most top managements have been focused on cutting costs, eliminating workers and outsourcing functions previously done in-house,' Mr Carter told the *Australian Financial Review.*

'Most have missed the value of building long-term commitment from staff who are dedicated to the organisation.

'Capability in terms of experience and intellectual capital is being run down right across the board.'

Mr Carter, who now chairs the Zeal Consulting Group in Melbourne said the focus on shareholder value often caused companies to adopt a 'one-dimensional approach', which failed to recognise that strategies not focused on the immediate bottom line could achieve lasting cultural change that contributed immensely to wealth creation.

He cited an occupational health and safety management program at BHP's iron ore operations in the Pilbara—introduced after two fatalities—that involved employees in redesigning work.

BHP spent $12 million to $13 million on modification of plant and workplace to eliminate hazards.

Although this reduced costs by eliminating workplace deaths and disabilities, its lasting benefits were in the 'intangible results', Mr Carter said.

'Employees suddenly felt the company was interested in their opinions, as well as their physical well-being. They didn't feel like a commodity,' he said.

'Without that, I don't think we could have achieved the no-strike agreement (subsequently endorsed by workers in an enterprise agreement).

'You couldn't point to an extra $10 million in EBIT but it had a massive effect in building commitment to the organisation and a stronger desire to see it succeed.'

Mr Carter criticised a 'commodification of professionalism' that failed to value the contribution of talented employees.

'That is the way we have treated employers on the shop floor forever (like commodities) and now employers are treating professionals the same way.'

He predicted that poor decisions and investments would result from 'the loss of in-house technical departments and professionals who were part of the intellectual capital and the corporate memory of organisations.'

Pressure from funds managers and institutional investors was often 'used as an excuse' for the short-term cost focus in management, he said.

'Managers have to have enough confidence to believe in their own analysis and ignore the noises off,' he said.

CFOs watch more than the figures

Margaret Lyons

Source: Lyons, M. 1994, 'CFOs watch more than the figures', *Business Review Weekly,* 12 Sept., pp. 110–11.

John Priest, Coca-Cola Amatil's director of finance, wants all staff from the managing director down to know how the food giant is progressing. To this end, Priest prepares concise financial statements, using simple charts and graphs, to show people on the factory floor whether their division is meeting budget and how it compares to other areas of the company. Such periodic updates serve to motivate the divisions, and are a key peg in the company's quest for continuous improvement.

Priest's hands-on attitude is typical of the new generation of financial controllers, an Ernst & Young study shows. Steve Robertson, a director of Ernst & Young Consulting and former financial controller of Smorgon Glass, surveyed the chief financial officers of 20 of the top 50 listed companies to ask which of their key tasks added value. It was not meant to examine their strengths and weaknesses, and, perhaps regrettably, did not ask about on-the-job problems.

According to Robertson, the survey highlights the degree to which the CFO's role has expanded and suggests these jobs might become a fertile breeding ground for chief executives of the future. It supports the need for CFOs to extend their vision beyond financial statements to include shareholders and customers.

Robertson asked for detailed responses from the CFOs of C-C Amatil, Caltex, Westpac, BHP and Coles Myer, who are responsible for assets totalling $100 billion. They all say they look beyond the traditional functions of the financial controller—minimising tax and cutting costs—to the broader issues of improving their company's performance. According to Robertson, they are greatly involved in the process of organisational change and, in many cases, are the main motivators and people who monitor the results.

'If you asked CFOs 10 years ago about their roles, most would say they were maintaining the books and making sure information was timely and accurate,' Robertson says. 'The role has broadened substantially to incorporate areas of stringent management of risk, and to being at the forefront initiating improvements. CFOs are more involved in the company's ground-level operations than ever before.'

John Chapman, Caltex Oil's general manager for finance and corporate services, is a good example. A main task for his department during the past two years has been to develop a corporate strategy, including issues of culture, motivation and leadership. Chapman's job involves the supervision of organisational change and management restructuring.

Coca-Cola Amatil's Priest interprets his role in the broadest terms, and nominates improving the organisational process and efficiencies as key elements. Derrick Heywood, Westpac's group executive (finance), and Geoff Heeley, BHP's executive general manager (finance), add functions such as maintaining good external relations with the rating agencies, corporate analysts and the investment market to their lists. Heeley is also responsible for redesigning systems and practices to world-best status. The CFOs say they have learnt a lot from the recession and have used it as a catalyst for the introduction, or acceleration, of organisational change.

Other CFOs have their hands full keeping track of the cash. John Barner, Coles Myer's director of finance and administration, has the task of monitoring the retail giant's cashflow, which peaks at more than $700 million in December. 'We collect revenue in more than 1700 locations and have 140 000 staff members,' Barner says. 'This makes it essential for us to have common systems that are integrated across the group to administer the company efficiently. In establishing these systems, it is crucial for the finance area to understand the needs of the operating business.' Like most respondents, Barner rates training—on which Coles Myer spends up to 4% of its annual payroll—as being high on his list of priorities.

As a result of the survey, Robertson has developed a loose model of the five elements with which the financial controller upholds the organisation's profitability. These are managing financial information, managing financial risk, cost management, managing cash and tax liabilities, and process improvement.

Although cash management, risk minimisation and ensuring financial discipline are the key tasks for most CFOs, all are aware of their part in implementing and monitoring change. As C-C Amatil's Priest says, playing a wider role in improving your company's performance comes from having the right mindset, rather than just using the right financial techniques. By straying from a strictly numbers approach, the modern CFO can help change and improve the company—and give his or her promotion prospects a boost.

Long-term financial planning and growth

Topic 2

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Suggested answers

Introduction

This topic will focus on the financial aspects of business growth and on the financial consequences of this growth.

Two basic questions arise from businesses wanting to grow:

1 'Why do they want to grow?' and

2 'How can these businesses plan to grow successfully?'

On the first question, you will recall from Topic 1 that the overriding goal of financial management should be to maximise the wealth of the owners. The growth of a business may help maximise this wealth. We are not, however, suggesting that growth will lead to maximising the wealth of the owners and that all businesses should be wildly passionate about growing. Growth brings with it business and financial problems that need to be addressed before the growth occurs.

The second question of how businesses can plan their growth is a more difficult question and will be the focus of this topic. Some businesses have 'extra capacity', i.e. they have more resources (land, labour and/or capital) available to them than they are presently using. Growth for these businesses should be easier than for those with no extra capacity. However, the principles outlined in this topic will apply both to those businesses with extra capacity and to those with no extra capacity.

We will also be focusing on *long-term financial planning*, not specifically on new sales and marketing approaches, or on better information technology or human resource approaches.

The long-term financial plan should reflect the overall effect of *all* of the company's operating activities (i.e. revenues less expenses), its financing ideas and its investment proposals. Note that we are looking at 'long term' because the value of the business is a present value, based on a longer term outlook of the prospects of the business.

Financial planning critical for new floated corporations

Financial planning is critical for new corporations. Like all firms, new corporations need to take care with their cash, profit and balance sheet projections. Cash planning is absolutely critical to ensure success. Forecasting, adjusting for uncertainties and analysing cost and value driver relationships are part of planning activities. Consider the firms below. As new starters on the Stock Exchange, they have to plan to ensure support in the share market.

Newcomers—share price now (17 April) and when price is floated

CBA (first tranche)	
Floated	**Sept. 1991**
Price then	**$5.40**
Low	**$5.80, Dec. 92**
Price now	**$19.22**

GIO	
Floated	**July 1992**
Price then	**$2.40**
Low	**$1.85, Nov. 92**
Price now	**$4.54**

Woolworths	
Floated	**July 1993**
Price then	**$2.45**
Low	**$2.57, Nov. 94**
Price now	**$5.63**

	Qantas	**David Jones**	**National Mutual**	**Colonial**
Floated	**Aug. 1995**	**Nov. 1995**	**Oct. 1996**	**May 1997**
Price then	**$1.90**	**$2.00**	**$1.50**	**$2.60**
Low	**$1.79, Nov. 96**	**$1.45, Feb. 97**	**$1.69, Feb. 97**	**$3.21, Jun. 97**
Price now	**$2.47**	**$1.71**	**$3.75**	**$5.68**

Source: Gitman et al. 1998, p. 651.

(Note: These figures are a bit dated but you should get the general idea.)

Objectives

At the completion of this topic, you should be able to:

- define financial planning;
- outline and apply ‘the percentage of sales approach’ to financial planning models;
- use the internal growth rate and sustainable growth rate to help guide the long-term planning of businesses based upon certain target ratios;
- develop strategies to deal with sustainable-growth-rate difficulties; and
- describe the limitations in the use of long-term planning models.

Learning resources

Textbook

Ross, S.A., Westerfield, R.W. & Jordan, B.D. 2000
Fundamentals of Corporate Finance
5th edn, Irwin McGraw-Hill, Boston, chapter 4.

Key concepts

The following key concepts are introduced and developed in this topic:

- financial plan;
- percentage of sales approach;
- internal growth rate;

- sustainable growth rate; and
- external financing necessary.

Financial planning

Financial planning is the process of planning the financial future of an organisation. It brings together all of the possible operating, financing and investment decisions of the business, and predicts the financial position of the business at various points in the future. It is the process of projecting the future consequences of present decisions, meshing them with possible future operating, financing and investment choices and then analysing and deciding which alternatives to select to drive the business forward into the future. This decision on alternatives is then embodied in a financial plan.

In this topic we will consider the issues that cause a business to be where it wants to be in the long term and why it wants to be in that position in the long term. We will not look at short-term financial planning (the management of cash, inventory, accounts receivable, account payable and the like, which are the shorter term assets and liabilities of the business).

Reading

Please read the introduction to Chapter 4 and 'What is financial planning?' (Section 4.1) in Ross et al. 2000, pp. 86–90.

You should note specifically:

- **The basic policy elements of financial planning are:**
  - ***the possible new assets purchased*;**
  - **the possible mix of debt and equity and any new debt or equity that may be raised;**
  - **the possible amount paid to shareholders by way of dividends; and**
  - **the possible amount of net working capital remaining in the firm as a result of its operations (p. 87).**
- **All of the above elements directly influence the future profitability, the need for new debt or equity and the opportunity for growth (p. 87).**
- **All of the above elements must be considered together for they interact on the future of the business (p. 87).**
- **It is necessary to think about the business having various future scenarios such as a worst case, normal (or base case) and an optimistic case (pp. 88–9).**
- **It is necessary to examine the interactions, explore the options, avoid surprises, ensure feasibility and internal consistency, and finally to have a plan that will be followed to get the business going in the direction and to the point that it wants to go (pp. 89–90).**

Financial planning is not only about forecasting for likely events and a likely future, but also thinking about these events and this future. Managers who think about the future of the business are likely to react faster if things don't go according to plan. Financial planning is also not about minimising the risks, but rather thinking about what can go wrong and the courses of action to take if things go wrong.

Financial management in practice

Management's ability to forecast accurately

In spite of the importance of forecasting to strategic planning, managers have mixed success in forecasting events and outcomes accurately. Inaccuracies, when they occur, have more to do with the nature of the environment than with management effort.

There is no shortage of dramatic examples to illustrate carefully designed forecasts that were widely off the mark. In the 1970s in the United States school administrators closed elementary schools as enrolments dropped. Forecasting that women's liberation had permanently reduced the birthrate, administrators acted to close schools permanently and, in some cases, even sell them. What happened, however, was that women merely delayed their childbearing years. In the mid-1980s, many of these same administrators found enrolments back at near-record levels.

As another example, most experts thought that the October 1987 stock market crash would bring on a recession in 1988. Managers who strategically positioned their organisations for the 1988 recession found that it didn't come.

Forecasting techniques are most accurate when the environment is static. The more dynamic the environment, the more likely management is to develop inaccurate forecasts. Forecasting has a relatively unimpressive record in predicting non-seasonal turning points such as recessions, unusual events, discontinuities, and the actions or reactions of competitors. The only major consolation for managers is that their competitors are unlikely to be any better than they are at forecasting accurately in a dynamic environment.

Although forecasting has a mixed record, managers continue to engage in the practice. They find that for many factors—such as revenues, demographic trends, new laws, and labour supplies—forecasting's record is quite solid. Moreover, by shortening the length of forecasts, managers improve their accuracy.

Source: Petty et al. 1996, p. 657.

Financial planning models

Financial planning models are simulation models designed to show how alternative financial strategies can impact on businesses' futures. They can be simple spreadsheet models, such as those that can be developed using Microsoft Excel or Lotus 123, or they can be quite powerful planning software packages such as 'Strategic Focus' or 'Goalfix' that can be bought from the various suppliers. Regardless of the nature of the model they should contain similar sorts of variables which you will see below.

Reading

Please read 'Financial planning models: A first look' (Section 4.2) in Ross et al. 2000, pp. 90–3.

You should note specifically:

- **Each of the variables used to make up the model:**

  1. ***the sales forecast;***
  2. **the forecasted balance sheet;**
  3. **the forecasted profit and loss statement;**
  4. **the statement of cash flows;**
  5. **the proposed future new assets bought;**
  6. **the possible new debt and equity raisings;**
  7. **the dividend policy of the firm;**
  8. **the need for a 'plug' variable; and**
  9. **the economic assumptions on which the model is based (pp. 90–2).**

- **It is necessary to rely on forecasting sales initially because sales can be a major element in the success or otherwise of a business. If a firm sells, it is able to employ people and employ assets and hopefully to make a sufficient return for the investors. Sales give a business its reason for being. If a business is unable to sell anything, why should there be a business at all?**

- **The use of the plug variable shows the impact of the change in any other variable (pp. 92–3).**

Exercise 2.1

Attempt 'Concepts review and critical thinking questions' 1 and 2 on p. 110 and 'Questions and problems' 1 on p. 111 of Ross et al. 2000.

The percentage of sales approach

In this section we will examine a more detailed method for financial planning: the percentage of sales approach, in which 'accounts are varied depending on a firm's predicted sales level' (Ross et al. 2000, p. 93). This approach includes elements like the amount of profit retained by the business rather than paid out as dividends, the amount of inventory and other assets that need to be held (or bought) to generate the forecasted level of sales and the amount of external financing needed to support the predicted level of sales and assets bought.

Reading

Please read 'The percentage of sales approach ' (Section 4.3) in Ross et al. 2000, pp. 93–8.

You should note specifically:

- **the impact of an increase in sales on cost of goods sold, which then impacts on the taxable income, and which in turn impacts on the amount of tax paid out and on the net income or net profit of the business (pp. 93–4);**
- **the impact of the dividend payout ratio on retained earnings and therefore on the equity side of the balance sheet (p. 94);**
- **the impact of an increase in sales on the level of inventory, accounts receivable, cash, and new fixed assets that must be acquired to generate this new sales level (pp. 95);**
- **the impact of an increase in sales on inventory and therefore on accounts payable (p. 95);**
- **the total impact of an increase in sales on the amount of the external financing needed (p. 96);**
- **the need to consider carefully where this external financing needed might come from (pp. 96–7); and**
- **the effect of having an under-utilised capacity (pp. 97–8).**

Exercise 2.2

Attempt 'Chapter review and self-test problems' 4.1 and 4.2 on pp. 108–9 and 'Questions and problems' 2, 3, and 4 on p. 111 of Ross et al. 2000.

External financing and growth

From our previous discussion we can see that growth and external financing are related; the higher the rate of growth the more likely the need for external financing. From where should this external financing come? Should the funds be raised by borrowing, or can we raise the capital required from the owners?

Reading

Please read the introduction to 'External financing and growth' and 'EFN and growth' (Section 4.4) in Ross et al. 2000, pp. 99–102.

You should note specifically:

- **the need to do a sensitivity analysis on projected sales growth rates, the amount of external finance needed and the newly projected debt-to-equity ratio (pp. 100–2); and**
- **the need to consider which financing option should be chosen (pp. 100–2).**

Internal growth rates and sustainable growth rates

In this section we will examine internal and sustainable growth rates which provide target ratios to help businesses with long-term financial planning. Internal growth rates try to tell us how quickly a business can grow without any external financing (debt or equity). Sustainable growth rates try to tell us how quickly a business can grow without any external equity financing but while maintaining a stable or constant debt-to-equity ratio. Both of these growth rates can be very useful to management.

Reading

Please read 'The internal growth rate' and 'The sustainable growth rate' (Section 4.4) in Ross et al. 2000, pp. 102–4.

You should note specifically:

- **the formula for the internal growth rate at equation 4.2 (p. 102); and**
- **the formula for the sustainable growth rate at Equation 4.3 (p. 103).**

Exercise 2.3

Attempt 'Chapter review and self-test problem' 4.3 (p. 108) and 'Questions and problems' 6, 7, 8, 9, 10, 11, 22 and 23 (pp. 112–5) in Ross et al. 2000.

Determinants of growth

If a company cannot or does not want to increase its equity capital, then there are basically four factors that influence a company's ability to sustain growth:

1. *A business's profit margin.* A company with a high profit margin is able to generate substantial funds internally and therefore able to have a relatively higher sustainable growth rate.
2. *Dividend policy of the company.* The more that is paid out by way of dividends, the less that is able to be used inside the business and therefore the less the ability to sustain growth.
3. *The financial policy of the company.* Companies which are able to increase their debt-to-equity ratio by taking on more debt will be able to strive for a higher sustainable growth rate.
4. *The ability to generate sales from assets.* If the company is able to increase its sales without increasing its assets then that company will not need to raise additional capital to fund the purchase of those assets. Such companies will be able to increase their sustainable growth rate.

Reading

Please read 'Determinants of growth' (Section 4.4) in Ross et al. 2000, pp. 104–6.

Exercise 2.4

Find out if anyone in your organisation is responsible for any financial planning. Ask the appropriate people why such planning is or is not done. If such planning is done, find out what your organisation's sustainable growth rate is and how it is derived. Then review whether your organisation has achieved the stated sustainable growth rate over the last two years and ask why it has (or has not) been achieved.

Strategies for dealing with sustainable-growth difficulties

Where a company wants to grow faster than a calculated sustainable growth rate (in the shorter term or in the longer term) the following approaches may be used to deal with the problem:

- increase profit margin;
- decrease the dividend payout;
- raise additional debt;
- increase the asset-turnover ratio;
- raise more equity;
- acquire or merge with other businesses.

Increase profit margin

Businesses may try to increase the firm's profit margin on the product sold so that more funds can be generated internally. They may sell to fewer customers at a higher margin, or sell higher margin products and eliminate lower margin products from their product range.

Decrease the dividend payout (increase the retention ratio)

The company may change its dividend policy and therefore its retention ratio. If it can keep more money in the business to help it grow rather than pay the funds out as dividends, it is able to sustain a higher growth rate. Trying to reduce dividend payout ratios or dividends per se can be a risky proposition for companies. Companies that reduce the dividends previously paid, or the dividend-payout ratio previously promised, can cause all sorts of uncertainty in the minds of the investors who may downgrade the value of the shares. This approach needs to be carefully considered.

An approach adopted by many companies is the use of dividend reinvestment plans. You will study the dividend policy of firms and dividend reinvestment plans in more detail in Topic 10. Dividend reinvestment plans basically allow shareholders to purchase more shares in the company rather than taking the cash dividend. Many companies use this technique to try and retain the cash that would otherwise have gone to the shareholders.

Raise additional debt

The company may have the ability to change its mix of debt and equity and its debt-to-equity ratio by raising additional debt. Some companies may seize the opportunity of changing their debt-to-equity ratio if they are clearly able to sustain a higher debt to the equity mix. Companies with very stable future sales and cash flow prospects, and a strong ability to pay their interest and principal payments on time, may want to increase their debt.

Increase the asset-turnover ratio (or decrease the capital-intensity ratio)

The company may be able to increase sales with the existing assets that it has, or with fewer assets than it has utilised in the past, by working those assets harder and not allowing the assets to grow as fast as it previously has done.

Raise more equity (or share capital)

Remember that the sustainable growth rate was arrived at under the assumption that no new equity would be sold. If we relax this assumption and sell more equity in the business, this would certainly help with our problem of managing growth.

Once the new equity is raised, then new debt can also be raised. This can be done so as to keep our debt-to-equity ratio in the proportion with which we were previously happy. This new equity raising and the subsequent debt raising can have a major impact on the sustainable growth rate of a company.

Whether or not this strategy is used will depend on two factors. Firstly, the availability of this outside equity (at a reasonable cost of funds); and secondly, whether the new equity will come from existing shareholders or new investors. If it were to come from new investors, the impact that this would have on the existing share price must be taken into account. Publicly listed companies are able to instigate a rights issue allowing existing shareholders the right to buy more shares in the proportion of shares already held. Such companies are also able to place (or issue) shares privately to any investors at the rate of up to 10% of the issued capital (the number of issued shares, not the dollar value of the issued capital) per annum in any 12-month period. This private placement allowance of 10% is non-cumulative. This means that a company cannot build up this allowance of 10% over say five years, and issue 50% in one year. You will learn more about equity raising later on in this unit.

What can companies that may not be publicly listed do?

There are basically three avenues of equity capital for them. Firstly, they can seek the capital from family and friends. Secondly, they can seek capital from individuals or other companies who might be interested in taking an equity position. Thirdly, they can try to get listed on the stock exchange. You will also learn more about these equity-raising possibilities later in this unit.

Acquire or merge with other businesses

Acquiring new businesses or merging with new businesses may also help sustainable-growth-rate difficulties to be managed. If these new businesses could improve the profit margin, or if they have excess borrowing capacity (compared to the present business), or if they have excess production capacity and can increase the sales through the utilisation of this excess production capacity, then this acquisition will help greatly with the sustainable-growth-rate problem.

It must be remembered that the funding of the acquisition will bring with it new problems that must be factored into the forecasted profit and loss statement, the forecasted balance sheet and the forecasted cash flow statement, and ultimately into the new sustainable-growth-rate model.

Other alternatives

What if a company is growing 'too fast', i.e. it is unable to fund the growth by using the techniques above—what then can be done?

There are hopefully management information systems in place that will allow the business to know that the growth is unsustainable in the longer term. As soon as the managers discover that the growth is going to be unsustainable they must act quickly. Ignoring the problem is likely to only worsen the problem.

Management must find out which drivers are causing this funding-growth problem. Sales certainly seem to be the biggest driver of all in terms of its impact on the growth of a company. If sales are growing too quickly and the need to fund assets as a result of these sales is the problem, then sales must be slowed down (if the profit margin can't be increased).

A company's dividend policy may also cause a problem with the use of the sustainable-growth-rate model. Remember that our model reflects a certain dividend payout or retention ratio. If the company has a dividend policy that calls for a stable and growing dividend rather than a certain dividend payout, this may cause a conflict in the use of our model. If the company has not had a good year last year in terms of profits but wants to maintain a stable or growing dividend then this must be factored into the sustainable-growth-rate model. If the company is not able to maintain its stated dividend policy because of the impact on its future cash position, then management must reconsider that stated dividend policy or rethink how it is going to fund the required dividend.

Some caveats regarding financial planning models

Remember that the financial planning models we have looked at often neglect some basic finance problems. Financial planning models are essentially designed to forecast accounting statements and may not emphasise financial problems such as risk and the timing of cash flows. Do not forget these issues when planning the long-term future of your business. We will consider them in the next few topics.

Reading

Please read 'Some caveats regarding financial planning models' (Section 4.5) in Ross et al. 2000, p. 107. Note that financial plans don't always allow businesses to decide what are the best investments to make, what the risk of such investments might be and how those investments might best be funded.

Exercise 2.5

Attempt 'Concepts review and critical thinking questions' 4, 5, 6, 7, 8, 9 and 10 on p. 110 of Ross et al. 2000.

Summary

Many firms take planning their financial future seriously. The idea of 'thinking' about the business' future and projecting the future with forecasted profit and loss statements and forecasted balance sheets can provide organisations with a target for where they want to be. This projected position can then be used to give financial direction. It may also be used to provide a benchmark against which performances may be measured.

The process of contemplating the future and the future position of the company is valuable in its own right because it allows managers to think about the company's progress and to react appropriately if surprises occur along the way.

Reading

Please read 'Summary and conclusions' (Section 4.6) in Ross et al. 2000, p. 107–8.

Review questions

Complete the following multiple-choice questions.

Review question 2.1

Financial planning

Which of the following is a basic policy element of financial planning?

I the capital budgeting decision

II the dividend policy decision

III the net working capital decision

(a) I only

(b) II only

(c) I and II only

(d) II and III only

(e) I, II and III

Review question 2.2

Sustainable growth rate

If a firm is to grow at its sustainable growth rate, its growth depends on which of the following factors?

I profit margin

II financial policy

III dividend policy

(a) I only

(b) I and II only

(c) I and III only

(d) II and III only

(e) I, II and III

Review question 2.3

Financial planning

Which of the following is a common element among financial planning models?

I asset requirement

II pro forma statements

III sales forecasts

(a) I only

(b) II and III only

(c) I and II only

(d) I and III only

(e) I, II and III

Review question 2.4

Sustainable growth rate

The sustainable growth rate depends on all of the following *except*

(a) the firm's ability to turn sales into income;

(b) the firm's projections of expected dividend payouts;

(c) the degree of financial leverage a firm expects to utilise;

(d) the level of new assets required as sales grow; and

(e) the firm's ratio of accounts receivable to inventory.

Review question 2.5

Internal growth rate

Moore Money Inc. has a profit margin of 11% and a retention rate of 70%. Last year, the firm had sales of $500 and total assets of $1000. What is the internal growth rate?

(a) 1.7%

(b) 2.6%

(c) 3.7%

(d) 4.0%

(e) 5.9%

Review question 2.6

Sustainable growth rate

Moore Money Inc. has a profit margin of 11% and a retention rate of 70%. Last year, the firm had sales of $500 and total assets of $1000. The desired debt–asset ratio is 75%. What is the firm's sustainable growth rate?

(a) 2.5%

(b) 4.0%

(c) 7.1%

(d) 11.3%

(e) 18.2%

Review question 2.7

External financing needed

Pickup Industries has a profit margin of 15% and a dividend payout of 40%. Last year's sales were $600 million and total assets were $400 million. None of the liabilities vary directly with sales, but assets and costs do. If the growth rate for Pickup is 20%, how much external financing is needed?

(a) $5.2 million

(b) $13.1 million

(c) $15.2 million

(d) $21.3 million

(e) $26.0 million

Review question 2.8

Sustainable growth

Suppose a firm has net income of $50, dividends of $15, assets of $1200 and a debt–equity ratio of 3.0. What is sustainable growth?

(a) 1.5%

(b) 4.0%

(c) 9.0%

(d) 13.2%

(e) 18.1%

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Suggested answers

Topic
2

Exercises

Exercise 2.1

1. The reason is that, ultimately, sales are the driving force behind a business. A firm's assets, employees, and, in fact, just about every aspect of its operations and financing exist to directly or indirectly support sales. Put differently, a firm's future need for things like capital assets, employees, inventory and financing are determined by its future sales level.

2. It's probably more important for a capital intensive company because such companies must make large cash outlays long in advance of actual needs. For example, a new manufacturing facility might have to be started years before the planned output is needed.

1. **Pro forma income statement** **Pro forma balance sheet**

Pro forma income statement		Pro forma balance sheet			
Sales	$11 000	Assets	$3850	Debt	$2475
Costs	7700			Equity	1375
Net income	$3300	Total	$3850	Total	$3850

Net income is $3300, but equity only increased by $125; therefore, a dividend of $3175 must have been paid. Dividends paid is the plug variable.

Exercise 2.2

2. **Pro forma income statement** **Pro forma balance sheet**

Pro forma income statement		Pro forma balance sheet			
Sales	$11 000	Assets	$3850	Debt	$2250
Costs	7700			Equity	2900
Net income	$3300	Total	$3850	Total	$5150
Dividends	$1650	EFN = $3850 – $5150 = – $1300			
Add. to RE	1650				

3. **Pro forma income statement** **Pro forma balance sheet**

Sales	$2257	Assets	$9150	Debt	$4600
Costs	915			Equity	4242
Net income	$1342	Total	$9150	Total	$8842

Growth in sales = ($2257 – 1850)/1850 = .22

EFN = $9150 – $8842 = $308

4. **Pro forma income statement** **Pro forma balance sheet**

Sales	$15 000	Assets	$91 200	Debt	$13 500
Costs	11 700			Equity	63 478
EBIT	3300	Total	$91 200	Total	$76 978
Taxes (34%)	1122				
Net income	$2178				
Dividends	$1200				
Add. to RE	978				

Dividends = ($1000 / $1815) ($2178) = $1200

EFN = $91 200 – $76 978 = $14 222

Exercise 2.3

6. ROA = NI / TA = $1 646 / $34 000 = .0484

b = 1 – 0.4 = 0.6

internal g = [0.0484 (.60)] / [1 – 0.0484 (.60)] = .0299 = 2.99%

7. ROE = NI / TE = $1646 / $12 000 = .1372

b = 1 – 0.4 = 0.6

sustainable g = [0.1372 (.60)] / [1 – 0.1372 (.60)] = .0897 = 8.97%

8. ROE = NI / TE = $5148 / $30 500 = .1688

b = 1 – 0.5 = 0.5

sustainable g = [0.1688 (.50)] / [1 – 0.1688 (.50)] = .0922 = 9.22%

maximum increase in sales = $23 000 (.0922) = $2120.60

9. **Heir Jordan Corporation**

Pro forma income statement

Sales	$19 200
Costs	10 800
Taxable income	$8 400
Taxes (34%)	2 856
Net income	$5 544
Dividends	$1 940.40
Add. to RE	3 603.60

Dividends = ($1617 / 4620) (5544) = $1940.40

10.

Heir Jordan Corporation

Balance sheet

Assets	($)	(%)	Liabilities and owners' equity	($)	(%)
Current assets			Current liabilities		
Cash	$2350	14.69	Accounts payable	$2000	12.50
Accounts receivable	5000	31.25	Notes payable	5000	n/a
Inventory	4000	25.00	Total	$7000	n/a
Total	$11 350	70.94	Long-term debt	13 000	n/a
Fixed assets			Owners' equity		
Net plant and equipment	20 000	125.00	Common stock and paid-in surplus	$10 000	
			Retained earnings	1350	
			Total	$11 350	
Total assets	$31 350	195.94	Total liabilities and owners' equity	$31 350	

11.

Heir Jordan Corporation

Pro forma balance sheet

Assets		Liabilities and owners' equity	
Current assets		Current liabilities	
Cash	$2702.50	Accounts payable	$2300.00
Accounts receivable	5750.00	Notes payable	5000.00
Inventory	4600.00	Total	$7300.00
Total	$13 052.50	Long-term debt	13 000.00
Fixed assets		Owners' equity	
Net plant and equipment	23 000.00	Common stock and paid-in surplus	$10 000.00
		Retained earnings	4803.45
		Total	$14 803.45
Total assets	$36 052.50	Total liabilities and owners' equity	$35 103.45

EFN = $36 052.50 – $35 103.45 = $949.05

22. b = 1 – ($1500 / $5000) = .7; ROE = NI / TE = $5000 / $18 000 = 27.78%

sustainable g = [.70 (.2778)] / [1 – .70 (.2778)] = 24.14%

new TA = 1.2414 ($58 000) = $72 001.20; D/E = $40 000 / $18 000 = 2.22

new TD = [D / (D + E)] (TA) = (40 / 58) ($72 001.20) = $49 656

additional borrowing = $49 656 – $40 000 = $9656

ROA = NI / TA = $5000 / $58 000 = .0862

internal g = [.0862 (.70)] / [1 – .0862 (.70)] = 6.42%

23. **AWOL Tours Inc.**
2000 Pro Forma Income Statement

Sales	$840 000
Costs	660 000
Other expenses	12 000
EBIT	$168 000
Interest	17 000
Taxable income	$151 000
Taxes (35%)	52 850
Net income	$98 150
Dividends	$39 260
Add to RE	58 890

AWOL Tours Inc.
Pro Forma Balance Sheet as of December 31, 2000

Assets		Liabilities and Owners' Equity	
Current assets		Current liabilities	
Cash	$24 000	Accounts payable	$60 000
Accounts receivable	42 000	Notes payable	5000
Inventory	72 000	Total	$65 000
Total	$138 000	Long-term debt	120 000
Fixed assets			
Net plant and equipment		Owners' equity	
	330 000	Common stock and paid-in surplus	$15 000
		Retained earnings	258 890
		Total	$273 890
Total assets	$468 000	Total liabilities and owners' equity	$458 890

EFN = $468 000 – 458 890 = $9110

Exercise 2.5

4. The sustainable growth rate is grater than 20%, because at a 20% growth rate the negative EFN indicates that there is excess financing still available. If the firm is 100% equity financed, then the sustainable and internal growth rates are equal and the internal growth rate would be greater than 20%. However, when the firm has some debt, the internal growth rate is always less than the sustainable growth rate, so it is ambiguous whether the growth rate would be greater than or less than 20%. If the retention rate is increased, the firm will have more internal funding sources available, and it will have to take on more debt to keep the debt–equity ratio constant, so the EFN will decline. Conversely, if the retention ratio is decreased, the EFN will rise. If the retention rate is zero, both the internal and sustainable growth rates are zero, and the EFN will rise to the change in total assets.

5. Presumably not, but of course, if the product had been *much* less popular, then a similar fate would have awaited due to lack of sales.

6. Since customers did not pay until shipment, receivables rose. The firm's NWC, but not its cash, increased. At the same time, costs were rising faster than cash revenues, so operating cash flow declined. The firm's capital spending was also rising. Thus, all three components of cash flow from assets were negatively impacted.

7. Apparently not! In hindsight, the firm may have underestimated costs and also underestimated the extra demand from the lower price.

8. Financing possibly could have been arranged if the company had taken quick enough action. Sometimes it becomes apparent that help is needed only when it is too late, again emphasising the need for planning.

9. All three were important, but the lack of cash or, more generally, financial resources ultimately spelled doom. Inadequate cash resources is usually cited as the most common cause of small business failure.

10. Demanding cash up front, increasing prices, subcontracting production, and improving financial resources via new owners or new sources of credit are some of the options. When orders exceed capacity, price increases may be especially beneficial.

Review questions

Review question 2.1	Option (e)
Review question 2.2	Option (e)
Review question 2.3	Option (e)
Review question 2.4	Option (e)
Review question 2.5	Option (d)
Review question 2.6	Option (e)
Review question 2.7	Option (c)
Review question 2.8	Option (d)

The time value of money

Topic 3

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Suggested answers

Introduction

In Topic 1 we suggested that maximising the wealth of the shareholders (by maximising the share price) should be the major objective of the financial manager and indeed of the board of directors. Before we discuss how companies evaluate investment opportunities with the purpose of maximising the share price, we need to understand one of the most important principles in finance—the time value of money.

Imagine that you had a rich uncle who recently passed away. Imagine also that this rich uncle bequeathed to you $1 000 000 in his will. There was, however, one condition contained in this bequest—that the money be given to you in five years time. You know that this is a lot of money and you know that even in five years time it will be lot of money but what might that single future amount be worth today?

Let's look at another situation. How would you react if someone came to you with the 'investment of a lifetime' and offered you a bank-guaranteed $100 000 at the end of each year for the next three years if you paid $250 000 for such an investment right now? Is this a good investment? Should you outlay the $250 000 in exchange for this three-year inflow of funds?

Intuitively, you know that money is worth more today than it is tomorrow—but how much more? In this topic, we will focus on time value of money problems like the above, and you will be able to determine 'how much more'. We will focus on converting today's values into future values and also converting future values into today's values (this is known as discounting). We will also calculate the effects of compounding interest, as opposed to simple interest and effective annual interest rates as opposed to annual percentage rates.

We will also begin our valuation of financial securities (assets) such as shares and bonds. We will try to understand why shares and bonds are priced the way they are and what gives these assets their value.

Objectives

At the completion of this topic, you should be able to:

- explain the concepts of simple interest and compound interest;
- explain the concept of 'the time value of money';
- define the concepts of 'future values' and 'present values';
- solve arithmetic problems involving compounding and discounting;
- determine the present values and future values of annuities;
- determine the present values of perpetuities;
- define the terms 'effective annual rate' and 'annual percentage rate'; and
- calculate the intrinsic values of shares and bonds.

Learning resources

Textbook

Ross, S.A., Westerfield, R.W. & Jordan, B.D. 2000
Fundamentals of Corporate Finance
5th edn, Irwin McGraw-Hill, Boston, chapters 5 and 6.

Key concepts

The following key concepts are introduced and developed in this topic:

- simple interest;
- compound interest;
- future value;
- present value;
- discount rate;
- annuity;
- annuities due;
- perpetuity;
- effective annual rate;
- annual percentage rate;
- intrinsic value;
- dividend valuation model;
- market value; and
- liquidation value.

The time value of money

Money has a value not only because of what it can buy but also because it is able to be invested over time. The time value of money, or the value of money over time, is the principle that $1 today is worth more than $1 tomorrow. The reasoning is simply that if we had $1 today, we could invest it to earn interest. Interest rates give money its time value.

Let's assume that you are a lender of money. Regardless of how you acquired the money (it was saved, given to you, etc.), you are foregoing a current consumption of something. You forego this current consumption in the expectation that the borrower will pay you interest to have their current consumption wants satisfied. Let's say, for example, that you are happy to lend your $1000 for one year at a 10% interest rate. This means that you are foregoing spending in the expectation of getting $100 interest ($1000 × 10%) plus the original $1000 back in one years time. The $100 is the 'reward' that you, the investor, would like to receive (or demand) for accepting the delayed consumption.

But we still need to consider why the interest rate of 10% in the above example is the appropriate rate (and required rate of return by you) that gives money a time value? The interest rate is required for three basic reasons: inflation, uncertainty and opportunity costs.

Inflation

Inflation erodes the purchasing power of money. If inflation exists, then $1 in one year will not buy as much as $1 will buy today. Interest rates always include an inflationary expectation. If you are the lender of money, you are not going to lend that money at less than the expected inflation rate because this would mean that by lending now your future consumption power would be diminished. In the previous example we assumed that you would be happy delaying your spending for one year if you received $1100 (your original $1000 plus the $100 interest). You would, of course, not be happy if inflation was 20% per year. You would want an interest rate of more than the inflation rate of 20% so that you could maintain and improve your purchasing and therefore consumption power.

Uncertainty

As time passes, the certainty of events and of cash flows is much less than it is today or tomorrow. You would intuitively be more certain of getting your money back from a borrower tomorrow than you might be in getting your money back in 30 or 40 years. This uncertainty is priced into the interest rate.

Opportunity costs

Opportunity costs are the costs of foregoing investing somewhere else, i.e. the earning potential of the money. There is a vast amount of lenders with money to lend and borrowers eager to borrow. The competitive pressures of lenders and borrowers will influence interest rates greatly.

Exercise 3.1

Look at various newspapers or magazines and find out what interest rates and inflation rates are expected for two or three different countries. Note that the interest rate will not be less than the expected inflation rate.

The time value of money—A business perspective

William Regan—Vice President and Treasurer, Entergy

As Vice President and Treasurer for Entergy, a large publicly held electric utility holding company with worldwide operations, I constantly make decisions based on time value of money concepts. We use time value to raise funds in the money and capital markets and evaluate investments that make the best use of corporate financial resources.

The time value of money is, in a way, the language of finance, a common denominator for discussing financial transactions and financial opportunities. It helps managers make sound corporate finance, investment and portfolio analysis decisions and also helps with personal financial planning.

Time value bridges the gap between consumption and investment. You can either convert money into tangible goods to consume now or invest it to earn greater future returns. This decision involves a tradeoff. For example, your choice to defer working to go to school now is a significant time value tradeoff. There is an opportunity cost—the wages you could earn now. You forgo current income because a college education means you can earn considerably more later. How do you equate the money you could earn today with your higher earning potential later? This is really an investment decision, and you use time value of money concepts to decide whether to make that tradeoff.

To properly use the tools presented in later [topics], you must first understand time value concepts and techniques. Once understood, concepts such as risk, return and valuation all begin to fit together.

At Entergy, we seek long-term investments that enhance owner wealth. We can either distribute profits to stockholders as dividends or invest them in other assets to earn an even greater return for them in the future. How do we compare paying dividends today to investing money in expectation of significant future cash benefits? The answer is time value of money.

Ultimately business professionals think in terms of economic return, of growth, of increased productivity. To choose the option providing greater return for the risk involved in a rational and logical manner, managers have to be very, very comfortable with the time value of money.

William Regan joined Entergy in 1995 as Vice President and Treasurer. He received a B.S. from the United States Air Force Academy and an M.B.A. and Ph.D. from the University of Wisconsin-Madison.

Source: Gitman 1997, p. 167.

Future value and compounding

The concept of a future value in finance is simply 'the cash value of an investment at some time in the future' (Ross et al. 2000, p. 113). The future point in time may be tomorrow, next week, next month, next year or many years from now. As we've already suggested, the future value will be a function of how much interest is earned on the initial investment plus the return (or recoupment) of the initial investment.

We will now look at the different ways in which the initial investment may attract interest—specifically simple interest and compound interest.

Reading

Please read the introduction to Chapter 5 and 'Future value and compounding' (Section 5.1) in Ross et al. 2000, pp. 118–24.

You should note in particular the following issues:

- **how an investment for a single period will grow to equal (1 + r) per dollar invested, where r equals the interest rate (p. 119);**

- **the definitions of simple interest (interest earned on the original principal without any reinvestment of the interest earned), compounding (the reinvesting of interest to earn more interest over time) and compound interest (interest earned on the original principal and on the interest reinvested) (p. 119);**
- **Equation 5.1 (p. 120) showing how the future value of an investment of $1 is calculated at an interest rate of 'r';**
- **how Equation 5.1 can be used to calculate the future value of investments where the initial amount invested (called 'the principal') is more than $1 (pp. 120–1);**
- **the amount of simple interest and compound interest earned on the principal invested (Table 5.1 and Figure 5.1 on p. 121);**
- **the use of the calculator function y^x to replace the $(1 + r)^t$ calculation in the future value formula. For example, where r = an interest rate of say 10% and t (time) = 5 years, we would have $(1 + r)^t = (1.10)^5$. We can then use a calculator to input a y value of 1.10 and an x value of 5 (p. 122).**
- **how Table A.1 at pp. A-2–3 at the rear of the book (Ross et al. 2000) can be used to calculate the future value of a single invested amount of $1 at various interest rates up to 36% and time periods up to 60; and**
- **the enormous magnification of an investment when the principal invested earns compound interest over longer periods (pp. 123–4).**

You should remember that the interest rate should relate to the time period of the investment. If you invested $1 for five years at a 12% interest rate compounding yearly, your investment will have a future value of $\$1 \times (1.12)^5 = \$1.76$. On the other hand, if your investment was able to earn interest that was compounding quarterly, monthly, weekly or perhaps even daily rather than yearly, you need to adjust the future value formula accordingly.

Let's assume that you invested $1 and were able to earn a compounding interest rate of 1% per month with the $1 invested for five years. The new future value would now be calculated using the same formula, (i.e. Equation 5.1, Ross et al. 2000, p. 120), but the *r* and *t* values need to be adjusted to reflect the monthly compounding effect of the interest. The future value would now be calculated as:

> Future value $= \$1 \times (1 + r)^t$ where $r = .01$ (being 1%) and $t = 60$ months (being over 5 years)
> $= \$1 \times (1.01)^{60}$
> $= \$1.81$

Note that if the interest was compounding quarterly, the *t* value would be 20 quarters (or 4 quarters × 5 years). If the interest was compounding weekly, the *t* value would be 260 (or 52 weeks × 5 years). If the interest was compounding daily, the *t* value would be 1825 (or 365 days × 5 years).

What about the *r* value? At this stage in your study you can assume that if an annual interest rate of say 12% is given, this will convert to 12% divided by the *t* value. For the previous example, a 12% rate where the interest is compounding quarterly would convert to 12%/4 or 3% per quarter. Similarly, a weekly compounding rate would be 12%/52 or .23% per week, and a daily compounding rate would be 12%/365 or .0329% per day.

If we recalculate a future value using a daily compounding rate of .0329% over 1825 periods (the five-year life of our investment), we would get:

Future value = $\$1 \times (1 + r)^t$ where $r = .000329$ (being .0329%) and $t = 1825$
$= \$1 \times (1.000329)^{1825}$
$= \$1.82$

Exercise 3.2

Attempt 'Chapter review and self-test problem' 5.1 (p. 135), and 'Questions and problems' 1, 2, 12, 18 and 19 (pp. 137–9) in Ross et al. 2000.

Present value and discounting

Being able to calculate a future value of investments is a wonderful business tool, but we should also be able to do the reverse and recalculate future values into values today (called 'present values'). If, for example, you wanted to have saved $10 000 in a bank account in five years time, what initial investment would you need to make today to have that $10 000 available to you? Just as you used the process of investing an initial sum and calculating the effects of a compounding interest rate to determine a future value, you can use the process of discounting at an interest rate to determine a present value.

Reading

Please read 'Present value and discounting' (Section 5.2) in Ross et al. 2000, pp. 125–8.

You should note in particular the following issues:

- **the definition of present value being the current value (or value today) of future cash flows discounted at an interest (or discount) rate (p. 125);**
- **the present value = future value divided by 1 + r (the interest rate) for a single period case (p. 125);**
- **the present value = future value divided by $(1 + r)^t$ as in Equation 5.2 if you are trying to calculate the present value of an investment where the future value is to be received at period t (pp. 125–6);**
- **the calculation $(1 + r)^t$ reflects a discount rate and that a discounted cash flow valuation is the calculation of the present value of a future cash flow (p. 126); and**
- **present values and discount rates are inversely related: the higher the discount rate, the lower the present value; the lower the discount rate, the higher the present value (p. 127).**

Ross et al. (2000, pp. A-4–5 at the rear of the book) provide Table A.2 that will help you discount the future value of $1 into a value today. So, as well as using the formula of the initial investment divided by $(1 + r)^t$, you can use the table to find the present value of $1 at various interest rates r at various time periods t.

We have discussed that $1 received in one years time where the discount rate was 10% could be translated into:

$$\begin{aligned}\text{Present value} &= \$1/(1+r)^t \quad \text{where } r=10\% \text{ and } t=1, \text{ so}\\ &= \$1/(1.1)^1\\ &= .9091\end{aligned}$$

This means that if you had 90.91 cents today and that 90.91 cents earned interest at a 10% interest rate that you would have $1 in one year from now. Try it: multiply 90.91 cents × 1.10 = 100 cents or the $1 in one years time.

Similarly, if r remained at 10% and $t = 2$, the present value of the $1 would be .8264, and if $t = 3$, the present value would be .7513 and so on. These results of .9091, .8264, .7513 etc. are called *discount factors*.

Now turn to Table A.2 (Ross et al. 2000, pp. A-4–5) and see the present value at a 10% discount rate where $1 is received in one years time. It's .9091. If the $1 is received in two years time, you will see that the present value is .826. If the $1 is received in three years time, you will see that the present value is .751.

This table will be very handy so long as the discount rate and the number of periods you are considering are in that table. If the discount rate or the number of periods are not in the table, then you will have to revert back to your calculator.

Remember also that this table uses $1 as the future value and that the discount factors are the factors relating to a $1 future value. If you are considering a future value of say $100, you will need to multiply the $100 future value by the $1 future value offered to you in the table, and then multiply that product by the discount factor in the table. For example, if you expected to receive $100 in one years time, then:

$$\begin{aligned}\text{Present value} &= \$100 \times \$1 \times .9091 \text{ where } r = 10\% \text{ and } t = 1, \text{ so}\\ &= \$90.91\end{aligned}$$

Similarly, if you expected to receive $50 000 in three years time, then:

$$\begin{aligned}\text{Present value} &= \$50\,000 \times \$1 \times .7513 \text{ where r} = 10\% \text{ and } t = 3, \text{ so}\\ &= \$37\,565\end{aligned}$$

You should soon forget to even multiply the future value by the $1 because the future value multiplied by $1 is equal to the future value in dollar terms anyway.

Exercise 3.3

Attempt 'Chapter review and self-test problem' 5.2 (p. 135), 'Concepts review and critical thinking questions' 2, 3 and 4 (pp. 136–7), and 'Questions and problems' 3, 4, 10, 11 and 14 (pp. 137–9) in Ross et al. 2000.

More on present and future values

In this section, we will examine the relationship between present and future values, and discuss a few basic concepts like return on investment (ROI) and how to calculate any part of the present value equation if you know three of the four parts. (Note: the four parts to the present value equation are the present value, the future value, the discount rate and the life or time horizon of the investment.)

Reading

Please read 'More on present and future values' (Section 5.3) in Ross et al. 2000, pp. 128–35.

You should note in particular the following issues:

- **the present value is the reciprocal of the future value (p. 128);**
- **the four parts to the present value equation are the present value, the future value, the discount rate and the life (or time horizon) of the investment (p. 129);**
- **the rate of return on a single period investment as calculated in Example 5.9 (p. 129);**
- **how to calculate rates of return on multiple-period investments by using the calculator or by using Table A.1 (pp. A-2–3); and**
- **how the Rule of 72 can be useful in calculating rates of return where you expect to double your investment (pp. 130–4).**
- **how you might use Microsoft Excel in solving time value of money calculations (pp. 133–4).**

Reading

Please read 'Summary and conclusions' (Section 5.4) in Ross et al. 2000, p. 135.

Exercise 3.4

Attempt 'Chapter review and self-test problems' 5.3 and 5.4 (p. 136), 'Concepts review and critical thinking question' 1 (p. 136) and 'Questions and problems' 5 and 15 (pp. 138–9) in Ross et al. 2000.

Multiple cash flows

So far we have only considered single cash flows in regard to future values or present values. We have tried to work out future values given certain initial investments and certain interest rates on that initial investment. We have also tried to work out present values given certain future values and certain discount rates.

Unfortunately, life for the financial manager is not that easy. When BHP invests in a mine in the USA or Chile, or anywhere else in the world for that matter, it is unlikely that the cash flows from that mine are going to result in a single cash flow. Even if we brought the discussion down to a more personal level, and you decide to invest in a property, it is unlikely that you will receive a single cash flow in return for your investment. It is more likely that you will receive multiple cash flows, i.e. flows that can occur at various time periods throughout the life of the investment. In this section we deal with these multiple cash flows and we try to value those flows either in future value or in present value terms.

Reading

Please read the introduction to Chapter 6 and 'Future and present values of multiple cash flows' (Section 6.1) in Ross et al. 2000, pp. 140–7.

You should note in particular the following issues:

- **the need to identify the timing of the cash flow on a time line (p. 141);**
- **the interest earned on each year's cash flow accumulating over time to determine a future value (pp. 142–3);**
- **the discounting of later years' cash flows at a greater discount factor than flows occurring earlier on in the life of the investment (pp. 144–6);**
- **how to calculate present values using an Excel spreadsheet (p. 146); and**
- **the major assumption behind the cash flows is that they occur at the end of each period, not during the period, and that our discount factors and our future value interest rates reflect this (p. 147).**

Exercise 3.5

Attempt 'Chapter review and self-test problems' 6.1 and 6.2 (p. 166) and 'Questions and problems' 1, 2, 16, 17 and 18 (pp. 170–1) in Ross et al. 2000.

Annuities and perpetuities

Sometimes we are confronted with cash flows that are going to be repetitive for a long period of time or perhaps even forever. Equal periodic (monthly, yearly or whatever period you like) cash flows for any number of periods are called annuities. Ross et al. (2000, p. 148) define annuities as 'a level stream of cash flows for a fixed period of time'.

The cash flows which occur repeatedly forever are called perpetuities.

It can be quite tedious to put down each cash flow on a time line and then compound the cash flows one by one to arrive at a future value. Similarly, it is tedious to put down the future cash flows and discount them one by one to arrive at a present value. In this section we will investigate an easier way to determine these future or present values.

Reading

Please read 'Valuing level cash flows: Annuities and perpetuities' (Section 6.2) in Ross et al. 2000, pp. 148–55.

You should note in particular the following issues:

- **the formula for the annuity present value factor: Equation 6.1 (p. 148);**
- **how to use the present value of an annuity table: Table A.3 located at pp. A-6–7 (pp. 149–50);**
- **how to use an Excel spreadsheet to determine annuity present values (p. 150);**

- **how to determine the annuity payment, the number of payments or the discount rate given three of the four variables in the annuity present value factor equation (pp. 150–3);**
- **how to use an Excel spreadsheet to determine annuity payments (p. 151);**
- **the formula for the annuity future value factor: Equation 6.2 (p. 153);**
- **the concept that annuities due are annuities 'for which the cash flows occur at the beginning of the period' rather than at the end of each period (p. 154); and**
- **the use of the formula at Equation 6.4 to calculate perpetuities (p. 154).**

You should look at Table A.4 in Ross et al. (2000, pp. A-8–9) now. This table shows the future value of an ordinary annuity of $1 for various interest rates up to 60 periods. The easy way to understand this table is to look at the 10% interest column and work your way down. Let's assume for the purposes of our discussion that the annuity of $1 will be received yearly.

The first future value factor is 1.0000. This represents that you will receive $1 at the end of the first year.

The second future value factor is 2.1000. This shows that you will receive $1 at the end of the first year and $1 at the end of the second year, but also that you will have earned interest of 10 cents on the dollar that you received at the end of the first year.

10¢ Y1

The third future value factor is 3.3100. This shows that you will receive $1 at the end of the first, second and third year, and also that you will have earned interest of 21 cents on the dollar that you received at the end of the first year and 10 cents on the dollar that you received at the end of the second year.

Follow the table down the 10% column making sure you understand the yearly annuity receipt (or payment) of $1 and the compounding nature of the interest received (or paid) on the previous periods' annuity of $1.

Look down at the 60-year figure of 3034.8. Note that even though only 60 nominal dollars, one year at a time, have been received (or paid), that the compounding and cumulative effect of the interest has pushed our investment (or borrowing) to have a future value of $3034.80! Does this give you any ideas as to making regular contributions into an interest-bearing account (or income-producing investment) as early on in your life as you can?

Exercise 3.6

Attempt 'Chapter review and self-test problem' 6.3 (p. 166), 'Concepts review and critical thinking questions' 1, 2, 3 and 5 (p. 169) and 'Questions and problems' 4, 6, 7, 8, 9 and 37 (pp. 170–3) in Ross et al. 2000.

Comparing rates: The effect of compounding

Sometimes there can be a lot of confusion about what an interest rate actually means. You will see in this next section how the compounding effect of interest may change a quoted (or stated or nominal) interest rate.

Reading

Please read 'Comparing rates: The effect of compounding' (Section 6.3) in Ross et al. 2000, pp. 156–60.

You should note in particular the following issues:

- **the meaning of an effective annual rate (pp. 156–8);**
- **the meaning of an annual percentage rate (pp. 158–9); and**
- **the effect of continuous compounding (pp. 159–60).**

Exercise 3.7

Attempt 'Chapter review and self-test problem' 6.4 (p. 166) and 'Questions and problems' 12, 13, 14 and 22 (pp. 171–2) in Ross et al. 2000.

Putting the future value and present value puzzle together

We will now try to put together some of the knowledge you have learned by some using it in a simple problem. Let's assume that you won a prize. The prize offered you \$100 000 that you could take today or \$10 000 per year at the end of each of the next three years, and a further \$100 000 at the end of the third year. Which way would you prefer to receive your prize?

You could begin by trying to calculate the future value of each of the two ways the prize may be taken. The calculations would be as follows.

The future value of the \$100 000 at the end of year 3:

$$\begin{aligned} FV3 &= \$100\,000 \times 1.10 \times 1.10 \times 1.10\ (1.10^3) \\ &= \$100\,000 \times 1.331 \\ &= \$133\,100 \end{aligned}$$

You would then compare this to the future value of each year's flows of \$10 000 for three years plus the \$100 000 at the end of year 3 denoted by:

$$\begin{aligned} \$10\,000 \times 1.1 \times 1.1 &= \$12\,100 \\ \$10\,000 \times 1.1 &= \$11\,000 \\ \$110\,000 \times 1 &= \$110\,000 \\ \text{Therefore, the FV3} &= \$133\,100 \end{aligned}$$

If the cash flows are certain you should be indifferent about which way you receive your prize. The future value in both cases amounts to \$133 100.

Now let's turn to Table A.1 at the back of your textbook (Ross et al. 2000, pp. A-2–3). You would look up the 10% interest rate for a period of three years and find that the future value factor is 1.331. This means if \$1 was invested today, with the compounding effect of a 10% interest rate, that $1 would have grown to $1.331.

Using Table A.1:

FV3 = $100 000 × 1.331
= $133 100

This gives the same result as using your calculator.

Compare this to:

$10 000 × 1.21 = $12 100 (Looking up the future value factor of $1 for two years at a 10% interest rate plus.)
$10 000 × 1.10 = $11 000 (Looking up the future value factor of $1 for one year at a 10% interest rate plus.)
$110 000 × 1 = $110 000 (Received at the end of the third year.)
Therefore, FV3 = $133 100.

Remember that the $10 000 each year was to be received at the end of each year and the final $100 000 was to be received at the end of the third year.

There is another way of calculating the future value of the $10 000 per year. If we look at the Annuity Table A.4 (Ross et al. 2000, pp. A-8–9), it will help us. Note that the $10 000 per year at the end of each year is an ordinary annuity. Note also that our table reflects an ordinary annuity for $1. If we look at the third-year 10% interest rate figure, you will find the factor of 3.31 (meaning that $1 received at the end of each year for three years will give us $3 plus 31 cents of compounded interest). If we get $3.31 for the $1 annuity, then a $10 000 annuity would give us $10 000 multiplied by 3.31 = $33 100. We need to add the $100 000 that we received at the end of the third year to this $33 100:

$100 000 + $10 000 × 3.31 (See Table A.4 annuity table) = $133 100.

We have discussed that discounting is the reverse of compounding and the present value is derived by discounting, while the future value is the result of compounding. Why don't we try to calculate the present value of our future cash flows and compare the two ways we are able to collect our prize in present value terms.

The $100 000 that we received today is already a present value expression. You need to compare this to the future cash flows that we will now discount.

We need to perform the following calculations using a calculator:

$10 000 @ Yr 1 = 10 000/1.10 = $9090
$10 000 @ Yr 2 = 10 000/$1.1^2$ = $8265
$110 000 @ Yr 3 = 10 000/$1.1^3$ = $82 645
$100 000

You can see that in present value terms you would be indifferent again about receiving the $100 000 today or getting the $10 000 per year at the end of each year for the next three years and the $100 000 at the end of the third year.

Let's use Table A.2 at the back of your textbook (Ross et al. 2000, pp. A-4–5) to determine the present value of the future cash flows.

$10 000 @ Yr 1 = 10 000 × .9091 =	$9091 (Representing that each $1 is discounted back to 90.91 cents per $1 received at the end of the first year.)
$10 000 @ Yr 2 = 10 000 × .8264 =	$8264 (Representing that each $1 is discounted back to 82.64 cents per $1 received at the end of the second year.)
$110 000 @ Yr 3 = 110 000 × .7513 =	$82 643 (Representing that each $1 is discounted back to 75.13 cents per $1 received at the end of the third year.)
=	$99 998 (or approximately $100 000 taking into account the rounding off in the present value factors.)

Note that we can also use the present value annuity factors provided in Table A.3 (Ross et al. 2000, pp. A-6–7). However, we can only use these for the annuity of $10 000 per year for three years, and we would continue to use the present value factor in Table A.2 for the $100 000 received at the end of the third year.

Mathematically, this would be:

$100 000 × .7513 + (from Table A.3) $10 000 × 2.487 = $100 000

You should now be able to clearly see how both the tables and simple arithmetic can be used to determine future and present values.

The table below may help you identify what each of the four tables in Ross et al. (2000) are useful for. Table A.1 helps you determine the future value of a single cash flow given various interest rates. Table A.2 helps you determine a present value from a single future value. Table A.3 helps you determine the present value of future annuities. Table A.4 will help you determine the future value of an ordinary annuity. Remember, all of these tables refer to a $1 sum.

Amount **Table A.1** Future Value	Annuity **Table A.3** Present Value
Amount **Table A.2** Present Value	Annuity **Table A.4** Future Value

You may suggest that if you had won a prize of $100 000 that you really have no problem at all. Think, however, if you had paid $100 000 for an investment that was to yield the cash flows above. If you had paid $100 000 and were to receive $10 000 per year for three years at the end of each year and $100 000 at the end of the third year would you still say that you were indifferent? This time you would say you were indifferent about making the investment, not indifferent about how you receive your prize. Later we will look at the valuation of investments and we will be able to determine the worth of an investment.

The above example assumes, of course, that the cash flows of $10 000 per year and the $100 000 are certain cash flows. If there is any uncertainty involved in receiving those cash flows you may need to reassess the situation. We will discuss the issue of uncertainty further later in this unit.

Turning lead into gold

The investment philosophy by which Warren Buffett, considered one of the top investors in the world today, and his partner Charles Munger, built Berkshire Hathaway, an insurance company (it invests its premium receipts in other companies), centres on compound interest. Munger often quotes Benjamin Franklin on compounding: 'tis the stone that will turn your lead into gold ... Money can beget money, and its offspring can beget more'.

The pair looks for 'compound interest machines' to buy for the very long term. Despite its high price, they bought Coca-Cola in 1988 because of the product's solid franchise, immunity from inflation and growing market share. Since then, it has earned a 25 per cent compound annual rate of return. The company See's Candies was acquired in 1972 for about $25 million. In 1995, See's pre-tax earnings of $50 million gave it a value of about $500 million—a 13.3 per cent compound rate of return for the 24-year period. Add in reinvested pre-tax retained earnings and the pre-tax return jumps to more than 23 per cent. Why haven't they taken cash out of the company? Munger explains that there aren't many investments earnings that rate, so Berkshire Hathaway prefers to leave its money to compound.

Source: Gitman et al. 1998, p. 182.

The valuation of long-term debt and shares

Before progressing, we need to understand what the terms 'value' and therefore 'valuation' mean. The term value can be used in many different contexts. Examples of the different uses of this term include market value, liquidation value and intrinsic value.

Market value is the value or the price someone would receive (pay) for a security (or an investment or an asset) where buyers and sellers negotiate a mutually agreeable price for that security. Liquidation value is the value or price someone could receive (or pay) if an investment or asset was sold when the business owning that investment or asset was not going to continue as a going concern. Intrinsic value is what the security ought to be worth based on current information about the future cash flow stream and discounted at the investors required rate of return. In this section we will concentrate on the intrinsic value of a security.

Two common investments we try to value are 'shares' and 'bonds'. Shares of publicly listed companies are very liquid and quite divisible, i.e. they can be converted (sold) for cash fairly quickly (within three days normally) and are able to be 'divided up' and sold even as individual shares. Bonds, which are a debt instrument, generally have the same attributes of liquidity and divisibility. The liquidity aspect does need to be checked however, because some bonds may not be able to be re-sold to another party on the open market.

Dividend valuation model

The dividend valuation model (also called 'the dividend growth model' or the 'Gordon valuation model', named after Professor Myron J. Gordon who is known to have first developed it) can help us determine the price of shares. Remember that shares, or stocks, are 'units are of interest' in a company and they represent a claim on the company's future net cash flows. The very difficult but necessary valuation is the valuation of those units of interest. In this section we will discuss the concept that the value of the shares is basically the discounted value of the future cash flow of those shares. The future cash flow that shareholders receive is essentially the future dividend flows from those shares; thus, the dividend flows are the major determinant of the value of shares. The dividend valuation model suggests:

$$P_{share} = \text{the future dividends discounted back to today's value}$$

Note that this assumption is consistent with the definition of 'intrinsic value' in that the value of an investment should represent the future cash flows of that investment discounted by a required rate of return.

A simple assumption that we can start with is that the current dividend will be paid in perpetuity. That is:

$$P_{share} = \frac{\text{Div.Yr1}}{(1+r)} + \frac{\text{Div.Yr2}}{(1+r)^2} \cdots \frac{\text{Div.Yr}t}{(1+r)^t}$$

or

$$P_{share} = \frac{D_1}{r}$$

where:

r = the required rate of return on those shares;

D_1 = the dividend expected at year 1 (or next year); and

P_{share} = the price of the share. This notation will be changed soon to P_0 to reflect the price we are prepared to pay for the share today, or at time 0.

You should recognise this formula as being the same as the present value of a perpetuity formula referred to earlier.

If, for example, the real dividend (D_1) was \$1 and the required rate of return on those shares was 15% (r), then:

$$P_0 = \frac{\$1}{0.15}$$

$$= \$6.67$$

A rational investor would be prepared to pay \$6.67 for the right to receive a certain \$1 per year in perpetuity, given that their discount rate is 15%.

What if the required rate of return increased to 20%. Would the investor be willing to pay more or less for the dividend stream? The investor would be willing to pay less because the time value of money is higher.

If the investor in the above example wished to only hold the share for the next three years before selling it, would this affect the amount the investor was willing to pay? The investor will receive the next three dividends, which are valued in present terms at:

$$= \frac{\$1}{(1.15)^1} + \frac{\$1}{(1.15)^2} + \frac{\$1}{(1.15)^3}$$

$$= 86.9 + 75.6 + 65.7$$

$$= \$2.28$$

But the investor also has the right to sell the share to someone else at the end of the three years. Assuming the purchaser has the same discount rate as the original investor, the share price at year 3 can be calculated as follows:

$$P_3 = \frac{D_4}{r}$$

The price of the share in year 3 can be determined by the next dividend, i.e. D_4 divided by the discount rate.

$$P_3 = \frac{\$1}{0.15}$$

$$= \$6.67$$

but remember that this is a value in three years time, not a present value. To convert to a present value you would calculate as follows:

$$P_0 = \frac{\$6.67}{(1.15)^3}$$

$$= \$4.39$$

Therefore, the original investor would be willing to pay in present value terms for the right to receive the next three dividends ($2.28), plus the right to sell the shares in three years ($4.39). The total the investor would be prepared to pay is $6.67 ($2.28 + $4.39) which is exactly the same amount that would be paid if the intention was to keep the share indefinitely. The example serves to illustrate that the share is simply valued on the basis of future cash flows, so that as long as the discount rate does not change, the value of the share will not change whether it is held indefinitely or sold after some period of time.

Growth in dividends

If a company's dividends were to grow at a certain constant rate, then:

$$P_0 = \frac{D_1}{r - g}$$

where

P_0 = the theoretical intrinsic price you should pay for a share today;

D_1 = the expected dividend at year 1 (or next year);

r = the required rate of return or discount rate in perpetuity; and

g = the expected growth rate in dividends in perpetuity.

Here's an example to help us through. Assume Speedy Copy Limited paid a $1 dividend last year, which is expected to grow at 10% forever. Assume also the required rate of return by Speedy's shareholders is 15%.

Then we can expect:

$$P_0 = \frac{\$1.10}{.15 - .10}$$

$$= \$22$$

We can also transform the formula in order to figure out the required rate of return by shareholders:

$$r = \frac{D_1}{P_0} + g$$

$$= \frac{\$1.10}{\$22} + .10$$

$$= 15\%$$

We can complicate the above formula slightly if a company's dividends grow at a constant rate for a period of time, but after some period the growth rate changes. For example, assume that a firm has just paid a dividend of $1. It is anticipated that dividends will grow at 10% per annum for the next three years and 5% per annum thereafter. Assume a required rate of return of 15%.

The dividend flow could be valued thus:

$$P_0 = \frac{\text{Div.Yr1}}{(1+r)} + \frac{\text{Div.Yr2}}{(1+r)^2} + \frac{\text{Div.Yr3}}{(1+r)^3} + P_3 \text{ (the price of the share at year 3)}$$

$$= \frac{1.1}{1.15} + \frac{1.21}{1.32} + \frac{1.33}{1.52} + P_3$$

$$= .956 + .917 + .875 + P_3$$

$$= \$2.75 + P_3$$

Valuing the dividends that come after year 3 is performed the same way we did it before.

$$P_3 = \frac{\text{Div.Yr4}}{r - g}$$

But this time the dividend at year 4 is going to be the dividend at year 3 multiplied by the new expected growth rate in dividends of 5% per annum.

$$P_3 = 1.33 \times 1.05 / (.15 - .05)$$

$$P_3 = \$13.97$$

Remember that this is the price at year 3 or the theoretical value in three years time, not the present value, or P_0. To convert to a present value you would calculate as follows:

$$P_0 = \$13.96/(1.15)^3$$

$$= \$9.19$$

Note that the dividend in year 4 is 5% larger than the dividend in Year 3, not 10%, and that the dividend valuation model in determining the price of a share always uses the next dividend. For example:

$$P_0 = \frac{D_1}{r - g'}, \qquad P_5 = \frac{D_6}{r - g'}, \qquad P_{99} = \frac{D_{100}}{r - g}$$

Thus, the intrinsic price of the share would be valued at $11.94 ($2.75 + $9.19).

We've used the notation of *r* to refer to the required rate of return in the above discussion and many authors of texts use that notation. The notation *k* is also used by many authors.

Remember that this is a *theoretical* valuation model and that great fortunes have been lost on theories that don't always explain why the price of the shares are not as the theory suggests they should be.

Exercise 3.8

Attempt 'Chapter review and self-test problems' 8.1 and 8.2 (p. 238) and 'Concepts review and critical thinking questions' 1 and 4 (p. 239) in Ross et al. 2000.

Debt securities

The pricing, or the valuation, of debt securities such as government or semi-government bonds or company bonds or debentures might best be explained using an example.

Assume that a major company wishes to raise some long-term debt capital for three years. The company will pay interest for the three years at the end of each year and it will return the principal at the end of the third year. It wants to issue a bond that has a face (or par) value of $1 000 and it will pay an interest rate of 10% per annum for three years. Assume the debt market is satisfied with this rate of return (coupon yield) of 10% per annum (or $100 interest per year). What should be the price (or value) of that security be today?

$$P_0 = \frac{\$100}{(1.1)^1} + \frac{\$100}{(1.1)^2} + \frac{\$100}{(1.1)^3} + \frac{\$1000}{(1.1)^3}$$

$$= \$90.91 + \$82.64 + \$75.13 + \$751.31$$

$$= \$1000$$

Now, what if the debt market changes one minute after you bought the bond for $1000 and a 7% rate of return is now required?

$$P_0 = \frac{\$100}{(1.07)^1} + \frac{\$100}{(1.07)^2} + \frac{\$100}{(1.07)^3} + \frac{\$1000}{(1.07)^3}$$

$$= \$93.46 + \$87.34 + \$81.62 + \$816.29$$

$$= \$1078.71$$

The buyer of the company bond has made money. The bond was purchased for $1000 and now, because the required rate of return has changed, the buyer should theoretically be able to sell the bond for $1078.71.

We all wish it was that easy to make money. Unfortunately, crystal balls do not work 100% of the time and people are not able to always predict market movements correctly.

Exercise 3.9

Attempt 'Chapter review and self-test problem' 7.1 (p. 211) in Ross et al. 2000.

Summary

In this topic we have discussed how to derive future values which rely on the compounding of interest and how to discount future values into present values.

These are important concepts to grasp as companies are always looking for investments that are worth more to them than to others. Financial managers must be able to compare cash flows that occur over time so that they can help determine which investments should be chosen and why they should be chosen. Understanding the time value of money (and why time gives money value) is imperative to valuing investment opportunities. It is also imperative because investments are undertaken today with the expectation of generating future cash flows. The financial manager must be able to value these future cash flows and compare them to the initial outlay required by the investment.

During the course of this topic we also practised our discounting on two very common financial securities: on long-term bonds and on shares. It is worth noting that the valuation of securities is not and never can be an exact science, just as a valuation of any investment can rarely be exact. The forecasting of future cash flows is a major problem in the valuation process and unlikely to be 100% accurate. We will look at this uncertainty of future cash flows more in later topics.

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Suggested answers

Topic
3

Exercises

Exercise 3.2

1. $\$5000\,(1.04)^{10} = \$7401.22$; $\$2401.22 - 200(10) = \$401.22$

2. $\text{FV} = \$2250(1.18)^{30} = \$322\,584$

   $\text{FV} = \$9310(1.06)^{16} = \$23\,651$

   $\text{FV} = \$76\,355(1.12)^{3} = \$107\,273$

   $\text{FV} = \$183\,796(1.08)^{7} = \$314\,994$

12. $\text{FV} = \$50(1.03)^{115} = \$1497.10$

18. $\text{FV} = \$2000(1 + .08)^{45} = \$63\,840.90$

    $\text{FV} = \$2000(1 + .08)^{35} = \$29\,570.69$

    Better to start early!

19. $\text{FV} = \$22\,000(1.06)^{6} = \$31\,207.42$

Answers to ‘Concepts review and critical thinking questions’

Exercise 3.3

2. Compounding refers to the growth of a dollar amount through time via reinvestment of interest earned. It is also the process of determining the future value of an investment. Discounting is the process of determining the value today of an amount to be received in the future.

3. Future values grow (assuming a positive rate of return); present values shrink.

4. The future value rises (assuming it’s positive); the present value falls.

Answers to ‘Questions and problems’

3. $\text{PV} = \$15\,451/(1.04)^{3} = \$13\,736$

   $\text{PV} = \$51\,557/(1.12)^{5} = \$29\,255$

   $\text{PV} = \$886\,073/(1.22)^{12} = \$81\,449$

   $\text{PV} = \$550\,164/(1.20)^{6} = \$184\,249$

4. $FV = \$307 = \$207.22(1 + r)3;$ $r = (\$307/207.22)^{1/3} - 1 = 14\%$

   $FV = \$761 = \$450.44(1 + r)^9;$ $r = (\$761/450.44)^{1/9} - 1 = 6\%$

   $FV = \$136\,771 = \$37\,548.84(1 + r)^{15};$ $r = (\$136\,771/37\,548.84)^{1/15} - 1 = 9\%$

   $FV = \$225\,810 = \$78\,871(1 + r)^{30};$ $r = (\$255\,810/78\,871)^{1/30} - 1 = 4\%$

10. $PV = \$425M/(1.08)^{20} = \$91\,182\,988$

11. $PV = \$1M/(1.16)^{80} = \$6.97$

14. $PV = \$100/(1.277)^{20} = \$0.75$

Exercise 3.4

1. The four parts are the present value (PV), the future value (FV), the discount rate (r) and the life of the investment (t).

5. $FV = \$1284 = \$541.79(1.04)^t;$ $t = \ln(\$1284/541.79)/\ln 1.04 = 22$ yrs

   $FV = \$4341 = \$1833.69(1.09)^t;$ $t = \ln(\$4341/1833.69)/\ln 1.09 = 10$ yrs

   $FV = \$402\,662 = \$22\,195.71(1.23)^t;$ $t = \ln(\$402\,662/22\,195.71)/\ln 1.23 = 14$ yrs

   $FV = \$173\,439 = \$96\,591.11(1.34)^t;$ $t = \ln(\$173\,439/96\,591.11)/\ln 1.34 = 2$ yrs

15. $FV = \$1.95M/(1 + r)^6 = \$3.52M;\ r = -9.37\%$

Exercise 3.5

1. $PV\ @\ 10\% = \$1000/1.10 + \$200/1.10^2 + \$800/1.10^3 + 1500/1.10^4 = \$2699.95$

   $PV\ @\ 18\% = \$1000/1.18 + \$200/1.18^2 + \$800/1.18^3 + 1500/1.18^4 = \$2251.68$

   $PV\ @\ 24\% = \$1000/1.24 + \$200/1.24^2 + \$800/1.24^3 + 1500/1.24^4 = \$1990.57$

2. $X\ @\ 3\%: PVA = \$1000\{[1 - (1/1.03)^8]/.03] = \$7019.69$

   $Y\ @\ 3\%: PVA = \$2000\{[1 - (1/1.03)^4]/.03] = \$7434.20$

   $X\ @\ 22\%: PVA = \$1000\{[1 - (1/1.22)^8]/.22] = \$3619.27$

   $Y\ @\ 22\%: PVA = \$2000\{[1 - (1/1.22)^4]/.22] = \$4987.28$

16. $FV = \$750[1 + (.10/2)]^{24} = \$2418.82$

17. FV in 5 years $= \$5000[1 + (.045/365)]^{5(365)} =$ $\$6261.53$

    FV in 10 years $= \$5000[1 + (.045/365)]^{10(365)} =$ $\$7841.34$

    FV in 20 years $= \$5000[1 + (.045/365)]^{20(365)} =$ $\$12\,297.33$

18. $PV = \$27\,000/(1 + .12/365)^{(365)6} = \$13\,143.87$

Exercise 3.6

Answers to 'Concepts review and critical thinking questions'

1. The four pieces are the present value (PV), the periodic cash flow (C) discount rate (r) and the number of payments, or the life of the annuity t.

2. Assuming positive cash flows, both the present and the future values will rise.

3. Assuming positive cash flows, the present value will fall, and the future value will rise.

5. If the total money is fixed, you want as much as possible as soon as possible. The team (or, more accurately, the team owner) wants just the opposite.

Answers to 'Questions and problems'

4. 15 yrs: $\text{PVA} = \$2250\{[1 - (1/1.10)^{15}]/.10\} = \$17\ 113.68$

   40 yrs: $\text{PVA} = \$2250\{[1 - (1/1.10)^{40}]/.10\} = \$22\ 002.86$

   75 yrs: $\text{PVA} = \$2250\{[1 - (1/1.10)^{75}]/.09\} = \$22\ 482.31$

   Forever: $\text{PVA} = \$2250/.10 = \$22\ 500.00$

6. $\text{PVA} = \$55\ 000\{[1 - (1/1.075)^{8}]/.075\} = \$322\ 151.70$; can afford the system.

7. $\text{FVA} = \$1000[(1.085^{20} - 1)/.085] = \$48\ 377.01$

   $\text{FV@ 40 yrs} = \$48\ 377.01(1.085)^{20} = \$295\ 682.54$

8. $\text{FVA} = \$50\ 000 = \$C[(1.095^{5} - 1)/.095];\ C = \$50\ 000/6.045 = \$8271.82$

9. $\text{PVA} = \$25\ 000 = \$C\{[(1 - (1/1.11)^{7}]/.11\}:\ C = \$25\ 000/4.712 = \$5305.38$

37. $\text{PVA} = \$10\ 000[1 - (1/1.14)^{20}/.14] = \$66\ 231.31$

Exercise 3.7

12. $\text{EAR} = [1 + (.08/4)]^{4} - 1 = 8.24\%$

    $\text{EAR} = [1 + (.12/12)]^{12} - 1 = 12.68\%$

    $\text{EAR} = [1 + (.06/365)]^{365} - 1 = 6.18\%$

    $\text{EAR} = e^{.21} - 1 = 23.37\%$

13. $\text{EAR} = .06 = [1 + (\text{APR}/2)]^{2} - 1;$ $\text{APR} = 2[(1.06)^{1/2} - 1] = 5.91\%$

    $\text{EAR} = .09 = [1 + (\text{APR}/12)]^{12} - 1;$ $\text{APR} = 12[(1.09)^{1/12} - 1] = 8.65\%$

    $\text{EAR} = .17 = [1 + (\text{APR}/52)]^{52} - 1;$ $\text{APR} = 52[(1.17)^{1/52} - 1] = 15.72\%$

    $\text{EAR} = .24 = e^{\text{APR}} - 1;$ $\text{APR} = \ln 1.24 = 21.51\%$

14. First National: $\text{EAR} = [1 + (.075/4)]^{4} - 1 = 7.71\%$

    First United: $\text{EAR} = [1 + (.075/2)]^{2} - 1 = 7.64\%$

22. $\$2(1 + r) = \$4;\ r = 4/2 - 1 = 100.00\%$ per week

    $\text{APR} = (52)100\% = 5200\%;\ \text{EAR} = [1 + (1)]^{52} - 1$

    $= \$450\ 359\ 962\ 737\ 049\ 500.00\%$

Exercise 3.8

1. The value of any investment depends on its cash flows, i.e. what investors will actually receive. The cash flows from a share of stock are the dividends.

.4. The general method for valuing a share of stock is to find the present value of all expected future dividends. The dividend growth model presented in the text is only valid (i) if dividends are expected to occur forever, that is, the stock provides dividends in perpetuity, and (ii) if a constant growth rate of dividends occurs forever. A violation of the first assumption might be a company that is expected to cease operations and dissolve itself in some finite number of years from now. The stock of such a company would be valued by applying the general method of valuation. A violation of the second assumption might be a start-up firm that isn't currently paying any dividends, but is expected to eventually start making dividend payments some number of years from now. This stock would also be valued by the general dividend valuation method of this chapter.

An introduction to capital budgeting

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Introduction

Analysing and making long-term investments (also called capital budgeting or budgeting long-term capital) is a very difficult but important task for the financial manager, and indeed for the board of directors. Many factors need to be considered in determining where money can best be invested. Apart from the existing economic conditions, future conditions and prospects also need to be considered. Investments by their nature require firms to commit funds for a long time, and overlooking important trends and future prospects can lead to an investment that may be initially profitable but not greatly desirable in the long term.

The investment decisions that we will look at in this topic will be investments in real assets. Real assets are those such as plant and equipment or land and buildings that produce and sell products or services that create value. We will also consider investments in businesses that use real assets to create value. Such investments may be small in dollar value magnitude or they may be substantial, involving billions of dollars of capital to create new products or services or new markets for these products or services. (We looked at the financial investments such as shares and bonds in the previous topic.)

The investment in real assets can be a cause of great delight or great frustration to managers. Committing capital (which has a cost associated with it) to ventures that create significant future cash flows can be enormously satisfying. Committing capital into ventures that create poor cash flows and returns can cause extreme anxiety and frustration.

In this topic we will study the capital budgeting process and the tools that will help the financial manager identify and select projects that will create value for their shareholders. We will study the tools of net present value, payback, discounted payback, the average accounting return, the internal rate of return and the profitability index.

All of these tools help the financial manager make better investment decisions. At this stage we will exclude the notion of risk; we appreciate that investment opportunities are rarely without some risk but we will turn our attention to that area in the next topic.

The Australian wine industry grabs the international spotlight

The Australian wine industry appears to be heading for global success. It is a value-added industry that is turning to non-traditional markets and building its success on quality and best international practice in providing value for money.

Within the domestic wine market, which has not been renowned for profitability, the successful large firms are those that have generated economies of scale and successfully differentiated products. Economies of scale have been created in a number of ways. On the marketing front, large volume sales have been achieved by building successful brand names which in turn have carried other entrants successfully into the market. For example, Orlando's *Jacob's Creek* was originally a red wine whose successful *brand name* (a form of product differentiation) was used to quickly establish inroads into the white-wine market by the release of *Jacob's Creek* whites. Other economies have been sought through rationalisation of production facilities and channels of distribution. For example, Penfolds consolidated their production facilities in the Barossa Valley. The Mildara group has built a carefully planned portfolio of products covering the various price bands without much overlap. Coupled with associated economies in distribution and avoidance of excessive discounting, it has built a sound base of profitability in the domestic market. For some companies, the product range is promoted on the basis of acknowledged international leaders; for example, Penfold's *Grange* is a flagship that is recognised internationally. Small winemakers have been able to find niche markets, by means such as distribution through exclusive stores.

The push into the international market is being made by the industry as a whole as well as independently by large producers such as Penfold's and Orlando. The international thrust is largely based on quality and value for money, carried on the back of frequent success in international wine shows; and by producing wines that consumers enjoy, featuring big flavours and fruitiness. Australian wine makers are being recognised more often as leaders in style and quality, so effectively that in the mid 1990s European competitors began to advertise that their wines were now being 'made in the Australian style'. The advantages of international success are clear—growth in sales volume and further economies of scale that could not be attained in the crowded, mature domestic market. And this is being carried by success in the strategies used in the domestic market. Internationally, product differentiation is partly carried on the name 'Australia', and partly by an extension of brand name and image. For example, *Jacob's Creek* has become, in the mid 1990s, the UK's biggest selling brand name in wine.

But to remind us that capital investment is risky even when the signs look good, the international marketing push has to be backed by investment of hundreds of millions of dollars in new vineyards and production facilities. The wine industry is notorious for the long lead-time before there is a return on investment, largely due to the number of years it takes for a vineyard to become productive and also because red wine often needs several years maturation before its release. Moreover, care must be taken to match the grape varieties planted with the right regions so that the wine styles produced meet not only current international taste but also future demand. Then there is the potential threat from countries such as those in the former Soviet bloc whose large wine production could become far more competitive with the right investment in quality, having potential cost and distribution advantages. On the other hand, Australian wine has had its biggest success in Europe, and the success there could be repeated in North America and Asia.

Source: Petty et al. 1996, pp. 235–6.

Objectives

At the completion of this topic, you should be able to:

- identify reasons why capital budgeting focuses on cash flows rather than on accrual accounting measures;
- calculate the net present value method when evaluating investments;
- calculate the investment evaluation methods of payback, discounted payback, average accounting return (and accounting rate of return), internal rate of return and profitability index;
- identify which cash flows are relevant in our capital budgeting analysis and explain why;
- explain the need to prepare pro forma financial statements before preparing the project cash flow statement;

- identify some major timing assumptions behind the project cash flow statement;
- explain the complications caused by changes in the net working capital of a project's life;
- explain how depreciation can impact on the project cash flow even though by itself depreciation is not a cash flow item;
- describe how inflationary expectations should be handled when analysing investments;
- outline how capital gains tax may have implications for investment decisions;
- apply the four ways of determining operating cash flows;
- analyse cost-cutting proposals;
- determine tender prices for long-term tender contracts;
- apply the equivalent annual cost technique to select projects involving unequal lifespans;
- perform an abandonment analysis;
- outline that non-monetary factors are often considered when making investment decisions; and
- describe the importance of a capital budgeting audit.

Learning resources

Textbook

Ross, S.A., Westerfield, R.W & Jordan, B.D. 2000
Fundamentals of Corporate Finance
5th edn, Irwin McGraw-Hill, Boston, chapters 9 and 10.

Reading

Freeman, M. & Hobbes, G. 1991
'Capital budgeting: Theory versus practice'
Australian Accountant
Sept., pp. 36–41.

Key concepts

The following key concepts are introduced and developed in this topic:

- abandonment value;
- capital budgeting audit;
- accounting rate of return;

- average accounting return;
- discounted payback period;
- Pro forma financial statements;
- equivalent annual cost;
- internal rate of return (IRR);
- profitability index;
- net present value (NPV);
- optimal lifespan (duration);
- payback period;
- mutually exclusive;
- prime cost depreciation;
- diminishing balance depreciation;
- incremental cash flow; and
- project cash flow statement.

A focus on cash

Capital budgeting is concerned primarily with cash flows rather than with accrual accounting profit flows. This may sit uncomfortably with those of you who have studied accounting which would have suggested that cash receipts and payments need to be adjusted to record expenses and revenues incurred or earned during that period. This is suggested to better match the revenues of an accounting period with the expenses of that accounting period and then show a more correct profit (or income) for that accounting period. The preoccupation with profits is not the focus of this topic.

Bringing investments back to the fundamental reason for making the investment in the first place is the essence of capital budgeting. We're sure that you (as managers working for the benefit of shareholders) wouldn't invest in assets such as a brewery that makes beer, a soft drink manufacturer that makes soft drinks or a clothing retailer that sells clothing simply because you wanted to make (or drink) beer or make soft drinks or sell clothes. The primary reason for making the investment is to create as much value as you can for the providers of the risk capital in the first place.

Van Horne et al. (1995, p. 387) suggest:

> ... cash, not accounting income, is central to all decisions of the company ... The firm invests cash now in the hope of receiving cash returns in a greater amount in the future. Only cash can be reinvested in the company or paid to shareholders in the form of dividends.

Let us put it another way. Firms use cash, not profits, to make investments. In return they expect future cash, not profits. This way firms can compare 'like with like'—cash for future cash discounted by the required rate of return.

Firms can then compare an outlay (or outflow) 'today' with an expected inflow 'today'. Using cash flows is theoretically the best way of determining the 'value' of the investment. If the cash outflows 'today' on a particular project are less than the cash inflows 'today' on that project, then surely that project would be a wise investment.

Net present value

Wouldn't it be wonderful if you could always pick investments that had a higher market value (or price that you could sell them for) than they cost? This is what the net present value tool (NPV) is all about. The tool helps us work out the present value of the inflows and then subtracts the present value of the outflows using a certain specified discount rate. The present value of the inflows would be reflected in a market value and the present value of the outflows would be our cost.

Reading

Please read the introduction to Chapter 9 and 'Net present value' (Section 9.1) in Ross et al. 2000, pp. 244–9. You should note:

- **the definition of net present value which is the difference between the market value of an investment and its cost (p. 245);**
- **how the net present value, positive or negative, can impact directly on share price (p. 247);**
- **the net present value rule which suggests that 'an investment should be accepted if the net present value is positive and rejected if it is negative' (p. 247). Some of you may want to purchase a $200 000 Porsche motor car and come up with all sorts of reasons why you should have one. But, in purely financial terms, if the investment would lead to a decrease in your wealth by giving you a negative net present value, then perhaps you should think twice; and**
- **how to calculate NPVs using an Excel spreadsheet (pp. 248–9).**

Exercise 4.1

Attempt 'Questions and problems' 8 and 11 in Ross et al. 2000, pp. 274–5.

The payback rule

A very common and well-used investment decision-making tool is called the *payback* or the *payback period* which is simple to calculate and very easy to understand. The payback period is the time it takes for the cash inflows to 'payback' our initial capital outlay or investment. It is basically 'the time it takes to get our money back'.

Reading

Please read 'The payback rule' (Section 9.2) in Ross et al. 2000, pp. 249–52. You should note:

- **the definition of the payback period (p. 249);**

- **how to calculate the payback period (p. 250);**
- **the two basic problems with its use: firstly, that it does not take into account the time value of money; and secondly that it will ignore cash flows after the playback period has been reached (p. 238); and**
- **the redeeming features of the rule: firstly, that the payback period favours short-term investments and it is biased towards getting your money back quickly in very difficult economic times, or in times of crisis, many companies will want to get their investment capital back quickly; and secondly, we know that the further out we predict into the future the less accurate our cash flow forecasts become, so the payback period simply forgets the cash flows after the payback has been reached—regrettably, it effectively values the cash flows after the payback period as worthless (p. 251–2).**

Exercise 4.2

Attempt 'Concepts review and critical thinking question' 3 (p. 272) and 'Questions and problems' 1, 2 and 3 (pp. 273–4) in Ross et al. 2000.

The discounted payback

A very useful form of the payback period is the discounted payback period. A definition of the discounted payback period is the number of years it takes to recoup the initial investment from discounted net cash flows.

Look at the following table, assuming a required rate of return of 15%.

Table 4.1

Year	0	1	2	3	4
	$'000	$'000	$'000	$'000	$'000
Operating cash flows		50	40	30	20
Initial investment	100				
Net cash flow	(100)	50	40	30	20
Present value factor (15%)	1	0.870	0.756	0.658	0.572
Present value of cash flows	(100)	43.50	30.24	19.74	11.44

Where the payback period for the above would be:

$$2 \text{ years} + \frac{10}{30}, \text{ or } 2.33 \text{ years}$$

the discounted payback period is:

$$3 \text{ years} + \frac{6.52}{11.44}, \text{ or } 3.57 \text{ years.}$$

Reading

Please read 'The discounted payback' (Section 9.3) in Ross et al. 2000, pp. 253–5. You should note:

- **the definition of the discounted payback period (p. 253);**
- **the crossover point in Figure 9.3 illustrating how the interest costs on the investment plus the initial investment will cross with the future value of the investment (p. 254);**
- **that the discounted payback period will help you calculate the NPV of the project (p. 254);**
- **the major advantage of discounted payback over regular payback is that the project's required rate of return, and therefore the time value of money, is taken into account (p. 255); and**
- **the major deficiency is that discounted payback (like the payback period) still ignores cash flows after the payback period (p. 255).**

Exercise 4.3

Attempt 'Chapter review and self-test problem' 9.1 (p. 270), 'Concepts review and critical thinking question' 4 (p. 272) and 'Questions and problems' 4 and 5 (p. 274) in Ross et al. 2000.

The average accounting return

As well as the previous investment evaluation techniques which are all cash based, there is another which is profit based. The average accounting return is defined basically as the average after-tax profit divided by the average capital cost of the investment.

Reading

Please read 'The average accounting return' (Section 9.4) in Ross et al. 2000, pp. 255–7. You should note:

- **the definition of average accounting return (p. 255);**
- **how to calculate the average accounting return (p. 256); and**
- **the three deficiencies of the model. Firstly, that it ignores the time value of money. Secondly, there is no real relationship between the initial investment which is in cash and the returns which are calculated using profits. Thirdly, because of the second point, the calculated average rate of return must be judged against a target average rate of return—but there is no real justification for the target when cash outflows and profit inflows are measured (pp. 256–7).**

There is an alternative accounting rate of return tool that you might encounter at some future point in your career. It is simply called the accounting rate of return and is a slight modification to the average rate of return method you have just learned. The formula is the average net profit (or net income) divided by the cost of the initial investment (rather than average investment).

Look at the example in Ross et al. (2000), p. 256, where the average accounting return is \$50 000/ \$250 000 or 20%. With the accounting rate of return formula you would have the same numerator of \$50 000, but the denominator would be different. The initial cost is \$500 000. So you would have \$50 000/ \$500 000 or a 10% accounting rate of return.

This accounting rate of return method suffers from exactly the same three deficiencies as the average rate of return method does. The only variation is that the denominator which is higher (using the accounting rate of return) would normally cause a lower percentage return result.

Exercise 4.4

Attempt 'Chapter review and self-test problem' 9.3 (p. 270) and 'Concepts review and critical thinking question' 5 (p. 272) in Ross et al. 2000.

The internal rate of return (IRR)

The internal rate of return (IRR) is the second most useful tool in determining the viability and appropriateness of an investment. It provides us with the rate of return that equates the present value of the inflows with the present value of the outflows and gives us a zero (0) NPV. It tells us the rate of return in present value terms of the investment.

Reading

Please read 'The internal rate of return' (Section 9.5) in Ross et al. 2000, pp. 257–66. You should note:

- **the definition of the internal rate of return (p. 257);**
- **how to calculate the internal rate of return (pp. 258–9);**
- **the net present value profile (p. 259);**
- **how to calculate IRR using a spreadsheet (p. 261);**
- **the possibility of multiple rates of return where cash flows change from positive to negative values over time (pp. 261–3);**
- **the concept of mutually exclusive investments where the investment in one project prevents, or precludes, the investment in another project (pp. 263–4);**
- **the NPV and the IRR methods may not give the same accept or reject signals when evaluating mutually exclusive investments—sometimes we may find that an investment that has a higher NPV but a lower IRR than some other competing investment (pp. 264–5); and**
- **the advantages of the IRR: firstly, it is a present value method of analysing investments; and secondly, that it provides a 'return per dollar invested in present value terms' measure which is easily understood and communicated (p. 265).**

Please make sure you understand that the NPV is superior to the IRR. Think of an investment that gave \$2 of cash inflows tomorrow on a \$1 investment today. This is a 100% internal rate of return investment, but regrettably it added only \$1 to our company's value (the NPV being \$1). This is a very handsome return per dollar invested of 100%, but hardly something to write to the shareholders about because of the ordinary magnitude of the wealth created. Another investment that has a much lower IRR, say 40%, but one that created a \$1 000 000 NPV would be much more to our liking than the 100% IRR investment above.

The other major issue that you must remember is that the IRR must be compared to a required rate of return. If the IRR on a project exceeds this required rate of return (called *the hurdle rate*), then the project, in IRR terms, would be an acceptable project. If the IRR did not exceed the hurdle rate then the project would not be acceptable. The hurdle rate is normally initially set as the discount rate that you would use in the NPV calculation. We will further discuss required rates of return in Topic 7.

Exercise 4.5

Attempt 'Chapter review and self-test problem' 9.2 (p. 270), 'Concepts review and critical thinking question' 7 (pp. 272–3) and 'Questions and problems' 7, 9, 10, 12 and 14 (pp. 274–5) in Ross et al. 2000.

The profitability index

The profitability index (PI) is the present value of the cash inflows divided by the initial investment. Some textbooks, or even some organisations, may refer to the profitability index as the ' present value index' or the 'benefit–cost ratio'. They all mean the same and have the same basic definition.

Reading

Please read 'The profitability index' (Section 9.6) in Ross et al. 2000, pp. 266–7. You should note:

- **the definition of the profitability index (p. 266);**
- **how to calculate the PI (p. 266); and**
- **the basic advantage of the profitability index is closely linked to the NPV and takes into account the time value of money concept. The basic disadvantage is that the index may be misleading. A PI of 2 on a $1 investment would not create nearly as much value to the firm as a PI of 1.5 on a $1 000 000 investment.**

Exercise 4.6

Attempt 'Concepts review and critical thinking question' 8 (p. 273) and 'Questions and problems' 15 and 16 (pp. 275–6) in Ross et al. 2000.

The practice of capital budgeting

Now that we have discussed the six basic methods of evaluating investment opportunities (NPV, payback rule, discounted payback, average accounting, return, IRR, PI), which methods are really used in business? The survey results given in the following reading from Ross et al. (2000) may surprise you a little. It is worth noting that these major surveys were conducted in the 1980s but one wouldn't expect there to have been major changes in the results of the surveys, except that the discounted cash flow methods of NPV and IRR might be used slightly more now than they were previously.

Reading

Please read 'The practice of capital budgeting' (Section 9.7) in Ross et al. 2000, pp. 267–8. You should note particularly:

- **the strong use of the IRR and NPV measures but the even stronger use of the payback period (p. 268);**
- **the popularity of the discounted cash flow (IRR and NPV) techniques as a 'primary method' for evaluating investments (p. 268); and**
- **the reasonably strong use of the average accounting return even with its major weaknesses (p. 268).**

Reading

Please read Freeman and Hobbes 1991, 'Capital budgeting: Theory versus practice' (pp. 1–4, up to the end of 'Capital budgeting techniques' section) to see how Australian firms use the capital budgeting techniques we have discussed. There is no need to take detailed notes. You will notice very similar usage of investment evaluation method results in Australia as those outlined in Ross et al. 2000.

Exercise 4.7

Find out who in your organisation analyses investment projects and who approves the expenditure.

Ask the person who analyses the investment proposals which of the six capital budgeting techniques they use and why they use them.

Ask the person who approves the expenditure which of the six techniques they prefer and why.

Which cash flows should be considered?

The first worry when analysing an investment opportunity is to identify those cash flows that are relevant and need to be considered. Very simply, the cash flows that need to be considered are those cash flows which are incremental, or extra, because of the project. Those cash flows which are not extra because of the project do not need to be considered.

Reading

Please read the introduction to Chapter 10 (p. 278), 'Project cash flows: A first look' (Section 10.1), p. 279, and 'Incremental cash flows' (Section 10.2), pp. 280–2, in Ross et al. 2000. You should note:

- **the definition of incremental cash flows is those that are a direct consequence of taking on the project (p. 279);**
- **the concept of the 'stand alone principle' suggests that the project is a kind of 'mini-firm' with its own revenues, expenses and assets, and our objective is to decide whether to acquire that mini-firm (p. 279);**
- **sunk costs, or those costs which have already been incurred, are irrelevant to our cash flows and should not be included in our analysis (p. 280);**
- **opportunity costs, or the costs of foregoing an alternative, are relevant and therefore should be included in our analysis (p. 280);**

- **the side effects of an investment need to be considered; a product or project that might erode or cannibalise an existing product line needs to show such impact in the investment analysis (p. 281);**
- **the need to provide extra cash to fund the working capital requirements of our new mini-firm (pp. 281–2);**
- **financing costs should not be included (p. 282); and**
- **tax payments need to be made on profits earned (p. 282).**

We need to expand a little on the last two points above.

Financing costs

Remember that we are primarily interested in discounting the future cash inflows of an investment and comparing this to the initial acquisition cost of the investment. If the present value of the cash inflows is greater than the initial acquisition cost then we have a positive NPV, meaning that we have added value to our company as a whole and we should proceed with the investment.

The initial acquisition cost of the investment is the cost of the assets. The future cash flows are then the cash flows generated or created by those *assets*. The way the assets are funded in the first place (whether by debt or equity), and the cost of funding those assets (either by interest payments to the debt providers or dividend payments to the equity providers), is where we get the company's required rate of return from. That is, if the cost of the debt and/or equity is for example 10%, then this must be our minimum required rate of return and hence our discount rate. To include the financing costs of debt and equity in our future cash flows, and then to discount the future cash flows by the cost of the debt and equity, means that we would be doubling up our financing costs and therefore our required rate of return.

Think of it this way. We are outlaying cash today in the expectation of future cash. Our problem is to compare the two sets of cash flows, not the funding of the initial outlay.

We will spend more time on the cost of a company's funds (commonly known as its cost of capital) in Topic 7.

Taxation

Even though we are not initially concerned with profits because our focus is on cash flows, we need to calculate profits in order to arrive at a cash flow item, i.e. tax. Tax is an inevitable consequence of making profits and the tax payments that are made must be included in our investment analysis.

Attempt 'Concepts review and critical thinking questions' 1 and 4 (p. 310) and 'Questions and problems' 1 and 2 (p. 311) in Ross et al. 2000.

Exercise 4.8

Pro forma financial statements and project cash flows

We are now nearly ready to prepare our project cash flow statement (also called our investment evaluation statement). However, before we can prepare this statement we need to forecast a profit and loss statement (or income statement) and forecast future capital requirements for the investment project under examination.

Reading

Please read 'Pro forma financial statements and project cash flows' (Section 10.3) in Ross et al. 2000, pp. 282–6. You should note in particular:

- **the format of the forecasted, or pro forma, income statement in Table 10.1 (p. 283);**
- **the format of the forecasted capital requirements statement in Table 10.2 (p. 283);**
- **the calculation of project cash flows (pp. 283–4);**
- **the recoupment of the working capital requirements at the end of the project's life (pp. 284–5); and**
- **the project cash flow statement in Table 10.5 (p. 285).**

The trial and error approach to the IRR

Some of you may not understand how Ross et al. (2000) use the trial and error approach to arrive at the IRR of 25.8% on p. 285 for the project under review. You will recall that the IRR is the discount rate that equates the present value of the inflows with the present value of the outflows, and hence the NPV = 0.

The IRR would thus be:

PV outflows = PV inflows

$$\$110\,000 = \$51\,780/(1+r) + \$51\,780/(1+r)^2 + \$51\,780/(1+r)^3$$

or NPV = 0

$$0 = -\$110\,000 + \$51\,780/(1+r) + \$51\,780/(1+r)^2 + \$51\,780/(1+r)^3$$

Trial and error literally means trying a rate (r) and seeing if the PV inflows equal the PV outflows (or NPV = 0). If you have an error (i.e. they don't equal, or NPV doesn't equal 0) then try another rate. If they don't equal (or NPV doesn't equal 0), try again until they do and NPV = 0.

Assumptions about the timing of the cash flows

In the preparation of the project cash flow statement we will make some critical assumptions about the timing of the items included in that statement. Below, you will find each major item and a discussion of the assumptions we might make.

Initial outlay on capital spending

We are assuming that the initial outlay is at the beginning of a financial year, which we call Year 0 (today) and that the financial year is 1 July to 30 June. We are also assuming that that initial outlay takes place on 1 July so that a full year of depreciation can be clamed in each of the years 1, 2 and 3.

We can relax the assumptions about the financial year being 1 July to 30 June and the investment taking place on 1 July if your organisation has a different financial year. You must, however, remember that the investment is assumed to be made on the first day of the financial year (or close enough) to allow for a full year of depreciation to be claimed so that the tax shield associated with the depreciation claim is allowed. If you cannot make the investment as assumed above then you must adjust the depreciation claim, and therefore the tax shield, accordingly.

Initial outlay on net working capital and its recoupment

Just as we assumed above that the investment on capital spending was to be at Year 0, we assume that the investment on working capital is also today. There are no tax consequences for such an assumption. The working capital investment is neither taxable, nor is it tax deductible. It simply represents the cash that needs to be found to fund our mini-firm so it can buy inventory, perhaps employ people and pay its bills as required.

Because the project is expected to be terminated at some future point in time, our working capital needs to be liquidated, or cashed in. We assume that we can cash in our working capital commitment at the same value as that which was invested at the start of the project.

Sales and costs

We are assuming the sales, variable operating costs and fixed operating costs occur at the end of each financial year. We have assumed this to make our operating cash flows and hence our project cash flow statement easier to understand. Note also this approach makes our cash flow estimates very conservative.

This is really a rather unrealistic assumption if the cash flows are more likely to occur uniformly throughout the year. The easy way of handling cash flows that occur uniformly throughout the year is to put the first six months of cash flows at Year 0, the second six at Year 1, the third six at Year 1, the fourth six at Year 2, the fifth six at Year 2 and the final six at Year 3. This breaks up the cash flows so that the timing of the cash flows is more accurately reflected on our time line. The discounting of the cash flows can then occur using this revised timing.

Even though we have explored how to revise the project cash flow to take into account the more uniform receipts (from sales) and payments (for variable and fixed operating costs), *you will not need to use this technique* to prepare the project cash flow for the problems in this unit. We think that you will find it easier to understand the project cash flow without adding this complication. Please keep it in mind, however, if you are preparing a project cash flow in your own work environment.

Taxation

The timing of the tax payments can also have a major impact on your analysis. Company tax rates in Australia are presently 34% of a company's taxable income (but the rates have varied from 33% to 49%).

The timing of the tax payment will be dependent on the business entity that undertakes the project and also on the level of taxable income.

Many legal entities are obliged to pay tax quarterly but, we will assume, for ease of illustration, that the full tax liability will occur at the end of each financial year. This approach, although conservative, is a simple one that you can use in the preparation of the project cash flow statement.

Exercise 4.9

Attempt 'Concepts review and critical thinking question' 3 (p. 310) and 'Questions and problems' 3 (p. 311) in Ross et al. 2000.

More on project cash flow

In addition to the assumptions regarding the timing of the cash flows above, Ross et al. (2000) focus on two other areas of project cash flows—net working capital and depreciation—and examine them in more detail.

Reading

Please read 'More on project cash flow' (Section 10.4) in Ross et al. 2000, pp. 287–98. You should note:

- **how changes in the net working capital affect receipts and payments (pp. 287–9) (you will recall that previously we assumed all the sales were immediate cash receipts and the costs were immediate cash payments);**
- **the modified accelerated cost recovery (or depreciation) system (MACRS) used in the USA (pp. 289–92);**
- **the profit or loss on the sale of the asset needing to be taxed or claimed back as a tax loss in the year of sale or disposal (pp. 291–2); and**
- **the project cash flow for the Majestic Mulch and Compost Company (pp. 292–8).**

Depreciation rates in Australia

The depreciation rates in Australia are different to the MACRS rates in the USA. In Australia, there is a prime cost (or straight line) method of depreciation and a diminishing (or reducing) balance method. Assets must be written off in line with their estimated effective lives, for example, if an asset is expected to have an effective life of five years, it must be written off at 20% per year if straight line is chosen, or 30% per year if diminishing balance is chosen. (Just for completeness, assets up to a value of $1,000 can be accommodated in a 'low value pool' and be depreciated at a diminishing value of 37.5% per year.)

Note that diminishing balance creates a higher depreciation claim earlier on in the life of the project. This may make it a more attractive rate to use when evaluating investments because of the time value of money concept and our ability to pay less tax earlier on in the life of the project.

Exercise 4.10

Attempt 'Chapter review and self-test problem' 10.1 (pp. 307–8) and 'Questions and problems' 9, 14 and 25 (pp. 312–14) in Ross et al. 2000.

Exercise 4.11

This problem involves calculating relevant cash flows with working capital changes.

Gumnut Enterprises Limited is considering an environment-friendly woodchip project. This project will take six years to exploit and will require the purchase of a new woodchip furnace costing $6 million. Estimates prepared by the company show sales of 50 000 tonnes in Year 1 are expected to grow at the rate of 20 per cent per annum therafter. Expected selling price is $40 per tonne and variable costs are expected to remain constant at $15 per tonne. Fixed costs are expected to remain at $45 000 per annum. Revenue and expense forecasts for the project are presented below. This project will require Gumnut to make an initial investment of $20 000 in working capital.

The management asks you to produce a set of cash flow calculations based on two scenarios. First, that working capital will remain constant at $20 000 throughout the project. Second, that annual total investment in working capital will be equal to 15 per cent of the projected sales revenue. Gumnut can depreciate its woodchip furnace on a straight-line basis over six years. The project has an estimated salvage value at the end of six years of $50 000. Assume a 40% tax rate.

Table 4.5: Relevant data for estimating operating net cash inflows

Year	1	2	3	4	5	6
(a) Sales (tonnes)	50 000	60 000	72 000	86 400	103 680	124 416
(b) Price per tonne	$40	$40	$40	$40	$40	$40
(c) Variable cost per tonne	$15	$15	$15	$15	$15	$15
(d) Fixed costs	$45 000	$45 000	$45 000	$45 000	$45 000	$45 000
(e) depreciation expense	$1 000 000	$1 000 000	$1 000 000	$1 000 000	$1 000 000	$1 000 000
(f) Working capital	$20 000	$20 000	$20 000	$20 000	$20 000	$20 000

(a) Determine the initial investment associated with the proposed replacement decision.

(b) Calculate the annual operating net cash inflows for years 1 to 6 associated with the proposed replacement, assuming working capital investment remains constant at $20 000.

(c) Calculate the terminal cash flow associated with the proposed investment decision.

(d) Calculate the total net cash flows for each year associated with the project.

(e) Calculate the initial investment, annual operating net cash flow and terminal cash flows for the project if the total investment in working capital in any year is estimated to be 15 per cent of annual revenue of that year.

Source: Gitman et al. 1998, p. 331.

Inflation

Over the years, companies have had to deal with the economic problem of inflation. Inflation is the increase in prices of goods and services sold and/or on the costs of producing and selling those goods or services. The Consumer Price Index (CPI) is an economic measure of price increases in Australia reflecting price increases over time in a 'normal' basket of goods and services. How then would the project cash flow statement reflect inflation? The answer is not at all complicated. Any anticipated price increases or increases in costs should be included directly into the project cash flow statement. The price increases should be specific price increases, not general price increases like the CPI provides.

Let's assume you expect to sell 10 000 widgets per year at $10 in the first year and you expect to be able to increase the price of the widgets each year for the next three years (which is the life of the project) at say 10% per year. The selling price would be $10 at Year 1, $11 at Year 2 and $12.10 at Year 3. The resultant revenue or sales figure would then be 10 000 units per year times the new selling price—$100 000 at Year 1, $110 000 at Year 2 and $121 000 at Year 3. Note the CPI might have been only 2% per year but if the selling price can be increased by 10%, then 10% is the rate which we use in the cash flows.

Let's assume further that your costs per unit at Year 1 were $5 and these too were expected to increase by 10% per year. The resultant costs figures would be multiplied by the expected unit sales and you would get costs of $50 000 at Year 1, $55 000 at Year 2 and $60 500 at Year 3.

This concept of increasing the cash inflows and outflows by any anticipated price increases shouldn't be too difficult to understand because these inflated cash flows are the *relevant* cash flows, i.e. they are the flows you expect to receive. Note also that if our prices decrease and/or our costs decrease then this too needs to be reflected in our project cash flow statement.

One further issue at this point. You will recall in our previous topic that our required rate of return has an inflationary expectation. That is, we would not be happy getting a rate of return that is less than the inflation rate. Recall also that this required rate of return (with the inflationary expectation) is also our discount rate. It makes sense then that our project cash flow statement includes any inflationary increases in prices and costs because our discount rate will also reflect an inflationary expectation.

Aside from the revenues and costs changing over the life of the investment, the cost of the initial investment itself may change. Read the following extract to see a major miscalculation by BHP.

BHP mining technology investment costs over-run by $900 million

BHP operates a major iron-ore deposit in the Pilbara region of Western Australia. When mined, the iron ore is shipped through the nearest port, Port Hedland, to customers overseas. The ore shipped contains several contaminants which reduce the iron content to around 60 per cent. The contaminants increase the energy required to melt the iron and reduce its selling price.

In the early 1990s BHP decided to build a hot briquetted iron (HBI) plant at Port Hedland to remove contaminants and raise the iron content of the ore above 90 per cent. This would reduce transport costs and allow for an increased price for ore shipped. The HBI plant would process the ore into small briquettes, which could be fed easily into electric arc furnaces.

The HBI plant, using new technology, was estimated to cost $900 million to build and to be ready for completion by the end of 1997. BHP's engineering division insisted on major changes to the original contract because of concerns about the safety of the plant. The changes caused the estimated completion cost to escalate to nearly $1800 million by mid-1997.

The cost over-run meant that the return earned on the investment would be only about 7 per cent, rather than the 15 per cent hurdle rate which BHP had recently set for all its projects. That is, if this had been a new project for consideration, it would no longer be acceptable. An additional problem is that the technology used in the plant has been superseded by technology which removes nearly all contaminants.

In making the decision to build the plant it appears BHP management ignored significant safety costs associated with the plant, and failed to be aware of better technology which was imminent. A major impact of the poor decision in building this plant was the resignation of the two senior managers in the minerals division of BHP responsible for the project.

Source: Gitman et al. 1998, p. 311.

Capital gains tax

In addition to companies paying income tax (on their taxable income), they may also need to pay capital gains tax. Assets that are sold, over and above an inflation-adjusted purchase price, may incur such a tax.

Alternative definitions of operating cash flow

There are four alternative ways of calculating operating cash flows. Those involved in capital budgeting use all four approaches so it is worth looking at them and proving that all four yield the same operating cash flow result. Remember, operating cash flow means cash flows in less cash flows out. Let's look at all four approaches together to see how each works.

Reading

Please read 'Alternative definitions of operating cash flow' (Section 10.5) in Ross et al. 2000, pp. 298–300. You should note:

- **the operating cash flows resulting from EBIT adding back depreciation and subtracting taxes (pp. 298–9);**
- **the bottom-up approach being after tax net income and adding back depreciation (Equation 10.1 on p. 299);**
- **the top-down approach being sales less costs less taxes (Equation 10.2 on p. 299); and**
- **the tax shield approach being sales less costs (giving earnings before depreciation), interest and taxes (EBDIT) multiplied by 1 minus the tax rate (giving the amount left after taxes are paid) and then adding the depreciation tax shield (Equation 10.3 on p. 300).**

The top-down approach

The top-down approach is a very well-used approach in practice so let's spend a little more time on it. Look at the operating cash flow figure of $51 780 on p. 284 of Ross et al. (2000). We do not have to add back the depreciation to the EBIT and subtract taxes paid. We only need to look at the cash flow items in the projected income statement in Table 10.3 of Ross et al. (2000, p. 284) and consider only these items.

Note firstly that we are assuming that the sales, variable operating costs and fixed operating costs are indeed cash flows. That is, that the sales are cash receipts (or inflows) and the variable costs and fixed costs are cash payments (or outflows). If this is not the case then we need to adjust the operating cash flow statement to reflect such cash flows as we have already discussed.

The cash flow items in Table 10.3 (Ross et al, 2000, p. 284) are:

Cash inflows		
Sales (assuming all are cash inflows)		$200 000
Less *cash outflows*		
Variable costs	$125 000	
Fixed costs	12 000	
Taxes	11 220	
Total cash outflows		148 220
Net operating cash flow		$51 780

You might ask why we need to prepare an income statement at all if we're looking at cash flows? There are two basic reasons for preparing the projected income statement. Firstly, the projected income statement (you will recall) helps us determine the amount of our tax liability and payment. Secondly, it is also helpful in our analysis of the investment providing us with the information required to determine profitability-type ratios such as gross profit margin, net profit margin and so on. Such an analysis helps determine the 'reasonableness' and 'appropriateness' of our figures. If you don't like what you see with the gross profit margin and net profit margin, its highly likely you won't be happy with the resultant project cash flow statement either. You will have covered these ratios and the interpretation and analysis of them previously in your studies.

Exercise 4.12

Attempt 'Chapter review and self-test problem' 10.2 (p. 308) and 'Questions and problems' 5 (p. 312) in Ross et al. 2000.

Some special cases of discounted cash flow analysis

There are three common cases involving discounted cash flows. The first is where companies consider cost-cutting proposals. The second is where companies are preparing bids to win at tender situations. The third is where we consider buying equipment but the equipment options have different economic lives.

Evaluating cost-cutting proposals

Companies often try to cut costs to try to improve operating efficiencies and increase the value of the company in so doing.

Reading

Please read 'Evaluating cost-cutting proposals' (Section 10.6) in Ross et al. 2000, pp. 301–3. You should note:

- **cost savings cause an increase in cash inflows by increasing EBIT (p. 301); and**
- **the impact that some cost-cutting proposals may have on a company's net working capital (Example 10.3 on pp. 302–3).**

Exercise 4.13

Attempt 'Chapter review and self-test problem' 10.3 (p. 308) and 'Questions and problems' 20 (pp. 313–4) in Ross et al. 2000.

Setting the bid price

Competitive tendering is very common in business these days. Let's use our discounted cash flow analysis to help us determine appropriate tender bids where the tender relates to more than one year of cash flows.

Reading

Please read 'Setting the bid price' (Section 10.6) in Ross et al. 2000, pp. 303–4. You should note:

- **the need to create a time line of cash flows (p. 304);**
- **the annuity factor may be able to be obtained from Table A.3 at the back of the textbook; and**
- **we are assuming a specific required rate of return (p. 304).**

Exercise 4.14

Attempt 'Questions and problems' 19 and 23 (pp. 313–4) in Ross et al. 2000.

Evaluating equipment options with different lives

We are often confused when trying to select equipment purchases when the equipment purchase options have different lives. Being able to financially compare such options can be very handy.

Reading

Please read 'Evaluating equipment options with different lives' (Section 10.6) in Ross et al. 2000, pp. 305–6. You should note in particular:

- **the calculation of equivalent annual cost (EAC) (p. 305); and**
- **the annuity factor may be able to be retrieved from Table A.3 at the back of the textbook.**

Exercise 4.15

Attempt 'Questions and problems' 17 and 18 (p. 313) in Ross et al. 2000.

Project lifespans and abandonment values

The time horizon or lifespan of a project is often a cause for concern in capital budgeting. The length of life of the project and the cash flows the project is able to generate over that length of life can be a real problem for financial managers. We are often not sure whether the project will last two, three or four years or longer. Sometimes a project may last in perpetuity, or forever. How then does the time horizon affect our capital budgeting analysis? Is there an optimal lifespan in some cases?

Let's tackle these questions with an example.

Example

Assume we are considering purchasing a machine for $100 000 that is expected to produce cash sales of $100 000 per year and have cash operating costs of $40 000 (both of these to be at the end of each year). The equipment can be depreciated at 20% per year ($20 000 per year), putting it in the 6.67 years to 10 years category for tax purposes. We are not quite sure how long we want to keep going on this project but we think two or three years is likely, although perhaps we might keep it going for four years. Estimates of the resale value of the equipment are:

Year 2	$70 000
Year 3	$50 000
Year 4	$30 000

The company's required rate of return on such a project is 20% per annum. Assume that the company tax rate is 50% and there is no additional net working capital investment.

To simplify the example, let's make some preliminary calculations. The annual after-tax cash flow from operations will be $40 000 (sales less operating costs less depreciation equals $40 000, less tax $20 000 and add back depreciation $20 000). If the asset is sold at the end of Year 2, the after-tax cash proceeds will be $65 000 (gross proceeds $70 000, less tax $5000 payable on the profit on sale of $10 000). The after-tax proceeds from sale at the end of Year 3 are $45 000 and Year 4, $25 000.

Evaluation assuming two-year life:
Capital spending—$100 000
Present value of after-tax operating cash flows—$40 000 x 1.5278 = $61 112
Present value of equipment sale proceeds—$65 000 x 0.6944 = $45 136
Net present value—($6248)

Evaluation assuming three-year life:
Capital spending—$100 000
Present value of after-tax operating cash flows—$40 000 x 2.1065 = $84 260
Present value of equipment sale proceeds—$45 000 x 0.5787 = $26 042
Net present value—($10 302)

Evaluation assuming four-year life:
Capital spending—$100 000
Present value of after-tax operating cash flows—$40 000 x 2.5887 = $103 548
Present value of equipment sale proceeds—$25 000 x 0.4823 = $12 058
Net present value—$15 606

The optimal lifespan for the project is four years because this is the only lifespan that gives the highest positive NPV. If management thought to do only a two-year or even a three-year time horizon, then the project would have been less than optimal. On the other hand if management really *believed* that the project would only last two or three years, then performing the four-year analysis is unrealistic and should not be done.

The analysis we've just done above is called an 'abandonment analysis'—it tries to determine if there is a better time to abandon a project. If the figures above were only changed slightly we might find that the optimal time to run the project might have been three years. Similarly, if we thought the project might even last five years, by doing the analysis above it might help determine that a project time horizon of four years might still have been better than five. The selling price of the equipment at the end of each year can be a major determinant in when to abandon a project.

Exercise 4.16

Attempt 'Questions and problems' 27 (p. 315) in Ross et al. 2000.

Non-monetary considerations

We have spent considerable time analysing capital investment projects quantitatively. It is, however, also important to look at the investment proposal over and above the numbers generated.

Many investments will be undertaken to improve staff amenities, or to meet Environmental Protection Authority laws, or to improve safety standards. A present value analysis in the form of initial outlay versus cost savings is very difficult to do for these sorts of projects and in practice it is often not done, but the project proceeds regardless.

Managers regard making these sorts of investment decisions as tactically or strategically sound business decisions.

We should spend a little time discussing the investment decision and corporate strategy. If a project analysis shows a positive NPV, the theory is that by investing in this project the firm's value will be increased. In theory this is correct, but the analyst must remember that the numbers presented are estimates. Business judgment must be applied and the estimates scrutinised carefully. If the investment is to be in an industry that the firm knows little about, or if it is to be in a firm that has low market share and low growth potential, the decision must be given careful thought. Investing in long-term projects (say 10–20 years), where margins are declining and/or which may be technologically outdated fairly quickly, may not turn out to be attractive investments at all.

Changes in the strategic direction of a company are sometimes fraught with danger. The following extract discusses a little of the history of a famous Australian company—Burns Philp.

Burns Philp & Company Limited

Established in 1883 as a Pacific trading company, Burns Philp had grown into a major diversified company by the early 1980s. Its major divisions were trading (in South-East Asia and the Pacific), finance (through Burns Philp Finance, QBE Insurance and Burns Philp Trustees), hardware (BBC Hardware) and food (Mauri and Cafe-Bar). By the late 1980s the returns from the Mauri division (established through the acquisition of Mauri Brothers and Thompson in 1981) were increasing according to expectations, with yeast sales making major contributions to profits. However, poor returns on trading, insurance and hardware were jeopardising the future prospects of the company.

A major reassessment of the company was undertaken in the late 1980s and early 1990s to take advantage of the food ingredients business which was seen as the area in which Burns Philp had a competitive advantage and one with the greatest growth potential and which could generate superior returns. It was decided to reposition the company as a global food ingredients company. Major operations, QBE Insurance and BBC Hardware were disposed of, along with many other activities in the finance and trading divisions. An aggressive expansion into the global yeast and spice manufacturing businesses was undertaken through the acquisition of other companies and the establishment of an off-shore manufacturing plant. By 1994, 90 per cent of revenue and profit was generated from the food business (16 per cent in 1985).

By 1996, Burns Philp was unrecognisable from the company it had been earlier. It had converted from a diversified conglomerate making returns from a large variety of activities into a company focused squarely on the international food ingredients business, being the world's largest fresh bakers' yeast manufacturer and the second-largest spice manufacturer.

If their financial managers had planned correctly, Burns Philp would acquire significant gains in market share, and shareholders would realise substantial returns. However, if the financial managers had not correctly anticipated projected net outcomes, the up-front commitment of time and money required by long-term investment projects could threaten the future of the company.

By late-1997, Burns Philp had already admitted defeat in one of its major activities, by announcing its intention to sell the spice division at a significant discount on cost, which would leave the company with a net loss of around $700 million. This loss threatened the company's very existence.

Source: Gitman et al. 1998, p. 299.

The capital budgeting audit

A good capital budgeting system is one that reviews investments regularly—quarterly or six-monthly reviews are not uncommon.

The audit involves:

- comparing actual performance with expected performance; and
- explaining variances in performance.

We have discussed that capital budgeting is not an exact science and that forecasted cash flows are subject to uncertainty and can fail to meet expectations.

The capital budgeting audit is very useful in systematically reviewing and improving operational efficiency and forecasted cash flows. In addition, the audit allows investment decisions to be reversed if necessary. If the present value of the inflows is less than the selling price of the investment, then it makes financial sense to sell the investment. We will discuss this more in the next topic.

Summary

We have covered a great deal of material in this topic.

The capital budgeting methods for evaluating investment opportunities occupied much of this topic. They are all used in practice and you should remember their advantages and disadvantages. You should also remember that the NPV tool is the best because it tells us the 'magnitude of the winnings' in present value terms and how much better off the firm would be for having made the investment.

We discussed how to prepare the project cash flow statement and identified various ways of determining operating cash flows. We also looked at the three special capital budgeting cases: cost-cutting proposals, setting bids prices and evaluating projects with different lives.

We also discussed some very important practical difficulties that are likely to arise in the capital budgeting process: the major difficulties being to accurately forecast future cash flows (including forecasting a selling price for the asset) and to forecast an appropriate time horizon for the investment. One major difficulty that we haven't yet focused on is risk. Risk basically means what can go wrong.

You should now, however, be capable of evaluating a complex project using discounted cash flow analysis using a specified discount rate.

Reading

You may find it useful to read the 'Summary and conclusions' for Chapter 9 (pp. 269–70) and Chapter 10 (p. 307) in Ross et al. 2000.

Review question

To help reinforce what you have studied in this topic, attempt the following major review question. You should spend around 60–90 minutes answering this question.

Review question 4.1

Complete the following case study.

Case study: Merimbula Casino Project

Background

Merimbula has been developing rapidly as a holiday destination for both Australian and overseas tourists. South New South Wales Investments is a company which has put together a project to build and operate a large hotel/casino in Merimbula. The hotel will have 600 rooms and will be constructed near the beach, with good access to the town and the airport.

South New South Wales Investments is seeking to raise $165 million in a private equity raising to build the casino, and has presented detailed projections of future profitability. In addition, information has been provided in relation to accounts payable and capital expenditure. These data are presented in Table 4.6 set out below. Initially there will be large

outlays during the construction phase of the project. The only working capital item which is significant is accounts payable, as payments from clients and patrons of the casino are expected to be obtained swiftly. The building will be opened for business in 19X3, and the opening year is expected to be a huge success owing to the novelty factor.

You are an investment analsyt for a large financial institution, the National Provident Society, which has been approached to contribute $40 million to the project.

Table 4.6: Merimbula Casino project—projected income statements

At 30 June ($000)	**19X1**	**19X2**	**19X3**	**19X4**	**19X5**	**19X6**	**19X7**	**19X8**	**19X9**
Total revenue			155 879	132 563	136 985	140 456	143 219	151 234	152 345
less direct costs			42 965	45 234	47 453	48 456	49 328	52 321	53 498
			112 914	87 329	89 532	92 000	93 891	98 913	98 847
less fixed costs			10 532	10 765	10 953	11 012	11 945	12 005	12 678
less depreciation			6780	6784	6788	6893	6843	6956	7840
less management fee			5634	5467	5678	6894	7023	7845	8034
Profit before tax			89 968	64 313	66 113	67 201	68 080	72 107	70 295
Tax @ 33%			29 689	21 223	21 817	22 176	22 466	23 795	23 197
Profit after tax			60 279	43 090	44 296	45 025	45 614	48 312	47 098
Additional information:									
Accounts payable		12,654	13 423	13 986	14 123	14 732	14 678	14 824	15 239
Capital expenditure	67,934	134,865	734	645	789	890	900	15 673	678

Required

Make a recommendation as to whether this is a worthwhile project by calculating its NPV and IRR.
Assumptions

(a) The cash flows have been developed on an assumption of 4 per cent inflation.

(b) The investment horizon is at the end of year 19X9, so that a perpetuity value (being the sale value of the hotel/casino at that time) can be calculated.

(c) In the perpetuity calculation future investment will earn exactly its cost of capital.

(d) In the perpetuity calculation capital expenditure on replacement of existing capacity will just equal depreciation expense.

(e) The project is all equity financed, and its risk justifies the use of an after-tax imputation-adjusted nominal discount rate of 16 per cent, incorporating an inflationary expectation of 6 per cent.

(f) The equity contributions will be made in two tranches as required to finance the construction of the building.

(g) The risk-free rate of interest is 10 per cent.

Source: Van Horne et al. 1995, pp. 438–9.

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Suggested answers

Topic 4

Exercises

Exercise 4.1

8 $\text{NPV} = -\$30\,000 + \$25\,000/1.09 + \$15\,000/1.09^3 = \$4518.53$;
NPV > 0 so accept the project.

$\text{NPV} = -\$30\,000 + \$25\,000/1.19 + \$15\,000/1.19^3 = -\$90.36$;
NPV < 0 so reject the project.

11 $\text{NPV} = -\$1500 + \$400 + \$500 + \$1300 = \$700$

$= -\$1500 + \$400/1.1 + \$500/1.1^2 + \$1300/1.1^3 = \$253.57$

$= -\$1500 + \$400/1.2 + \$500/1.2^2 + \$1300/1.2^3 = -\$67.13$

$= -\$1500 + \$400/1.3 + \$500/1.3^2 + \$1300/1.3^3 = -\$304.73$

Exercise 4.2

Answer to 'Concepts review and critical thinking question'

3 (a) Payback period is simply the accounting break-even point of a series of cash flows. To actually compute the payback period, it is assumed that any cash flow occurring during a given period is realised continuously throughout the period, and not at a single point in time. The payback is then the point in time for the series of cash flows when the initial cash outlays are fully recovered. Given some predetermined cutoff for the payback period, the decision rule is to accept projects that payback before this cutoff, and reject projects that take longer to payback.

(b) The worst problem associated with payback period is that it ignores the time value of money. In addition, the selection of a hurdle point for payback period is an arbitrary exercise that lacks any steadfast rule or method. The payback period is biased towards short-term projects; it fully ignores any cash flows that occur after the cutoff point.

(c) Despite its shortcomings, payback is often used because (1) the analysis is straightforward and simple and (2) accounting numbers and estimates are readily available. Materiality considerations often warrant a payback analysis as sufficient; maintenance projects are another example where the detailed analysis of other methods is often not needed. Since payback is biased towards liquidity, it may be a useful and appropriate analysis method for short-term projects where cash management is most important.

Answers to 'Questions and problems'

1 Payback = 2 + ($500/$700) = 2.71 years

2 Payback = 4($300) + ($200/$300) = 4.67 years

= 5($300) + ($250/$300) = 5.83 years

8($300) = $2400; project never pays back if cost is $2500

3 A: Payback = 2 + ($5000/10 000) = 2.5 years

B: Payback = 3 + ($10 000/$250 000) = 3.02 years

Using the payback criterion and a cutoff of 3 years, accept project A and reject project B.

Exercise 4.3

Answer to 'Concepts review and critical thinking question'

4 (a) The discounted payback is calculated the same as is regular payback, with the exception that each cash flow in the series is first converted to its present value. Thus discounted payback provides a measure of financial break-even because of this discounting, just as regular payback provides a measure of accounting break-even because it does not discount the cash flows. Given some predetermined cutoff for the discounted payback period, the decision rule is to accept projects whose discounted cash flows payback before this cutoff period, and to reject all other projects.

(b) The primary disadvantage to using the discounted payback method is that it ignores all cash flows that occur after the cutoff date, thus biasing this criterion towards short-term projects. As a result, the method may reject projects that in fact have positive NPVs, or it may accept projects with large future cash outlays resulting in negative NPVs. In addition, the selection of a cutoff point is again an arbitrary exercise.

(c) Discounted payback is an improvement on regular payback because it takes into account the time value of money. For conventional cash flows and strictly positive discount rates, the discounted payback will always be greater than the regular payback period.

Answers to 'Questions and problems'

4 $7000/1.15 = $6086.96; $7500/1.15^2 = $5671.08; $8000/1.15^3 = $5261.13; $8500/1.15^4 = $4859.90

Cost = $8 000: Discounted payback = 1 + ($8 000 – $6086.96)/$5671.08 = 1.34 years

Cost = $13 000: Discounted payback = 2 + ($13 000 – $6086.96 – $5671.08)/$5261.13 = 2.24 years

Cost = $18 000: 3 + ($18 000 – $6086.96 – $5671.08 – $5261.13)/$4859.90 = 3.20 years

5 $R = 0\%$: 4(1100) + (600/1100) = 4.55 years; discounted payback = regular payback = 4.55 years

$R = 5\%$: \$1100/1.05 + \$1100/1.05^2 + \$1100/1.05^3 + \$1100/1.05^4 + \$1100/1.15^6 = \$4762.43; \$1100/1.05^6 = \$820.84

discounted payback = 5 + (\$5000 – \$4762.43)/\$820.84 = 5.29 years

$R = 15\%$: \$1100/1.15 + \$1100/1.15^2 + \$1100/1.15^3 + \$1100/1.15^4 + \$1100/1.15^5 + \$1100/1.15^6 = \$4162.93; never pays back

Exercise 4.4

Answer to 'Concepts review and critical thinking question'

5 (a) The average accounting return is interpreted as an average measure of the accounting performance of a project over time, computed as some average profit measure due to the project divided by some average balance sheet value for the project. This text computes AAR as average net income with respect to average (total) book value. Given some predetermined cutoff for AAR, the decision rule is to accept projects with an AAR in excess of the target measure and reject all other projects.

(b) AAR is not a measure of cash flows and market value, but a measure of financial statement accounts that often bear little semblance to the relevant value of a project. In addition, the selection of a cutoff is arbitrary, and the time value of money is ignored. For a financial manager, both the reliance on accounting numbers rather than relevant market data and the exclusion of time value of money considerations are troubling. Despite these problems, AAR continues to be used in practice because (1) the accounting information is usually available, (2) analysts often use accounting ratios to analyse firm performance, and (3) managerial compensation is often tied to the attainment of certain target accounting ratio goals.

Exercise 4.5

Answer to 'Concepts review and critical thinking question'

7 (a) The IRR is the discount rate that causes the NPV of a series of cash flows to be equal to zero. IRR can thus be interpreted as a financial break-even rate of return; at the IRR discount rate, the net value of the project is zero. The IRR decision rule is to accept projects with IRRs greater than the discount rate, and to reject projects with IRRs less than the discount rate.

(b) IRR is the interest rate that causes NPV for a series of cash flows to be zero. NPV is preferred in all situations to IRR; IRR can lead to ambiguous results if there are non-conventional cash flows, and also ambiguously ranks some mutually exclusive projects. However, for stand-alone projects with conventional cash flows, IRR and NPV are interchangeable techniques.

(c) IRR is frequently used because it is easier for many financial managers and analysts to rate performance in relative terms, such as '12%', than in absolute terms, such as '\$46 000'. IRR may be a preferred method to NPV in situations where an appropriate discount rate is unknown or uncertain; in this situation, IRR would provide more information about the project than would NPV.

Answers to 'Questions and problems'

7 $0 = -\$30\,000 + \$25\,000/(1 + \text{IRR}) + \$15\,000/(1 + \text{IRR})^3$;
$\text{IRR} = 18.78\% > R = 18\%$, so accept the project.

9 $\text{NPV} = -\$1500 + \$400(\text{PVIFA}_{8\%,8}) = \$798.66$;
accept the project if $R = 8\%$

$\text{NPV} = -\$1500 + \$400(\text{PVIFA}_{24\%,8}) = -\$131.51$;
reject the project if $R = 24\%$

$\$0 = -\$1500 + \$400(\text{PVIFA}_{\text{IIR},8})$; $\text{IRR} = 20.78\%$;
indifferent about the project if $R = 20.78\%$

10 $0 = -\$1500 + \$400/(1 + \text{IRR}) + \$500/(1 + \text{IRR})^2$
$+ \$1300/(1 + \text{IRR})^3$; $\text{IRR} = 17.63\%$

12 (a) A: $\$0 = -\$11\,000 + \$4000/(1 + \text{IRR}) + \$5000/(1 + \text{IRR})^2$

$+ \$6000/(1 + \text{IRR})^3 + \$1000/(1 + \text{IRR})^4$

$\text{IRR} = 18.75\%$

B: $\$0 = -\$11\,000 = \$1000/(1 + \text{IRR}) + \$6000/(1 + \text{IRR})^2$

$+ \$5000/(1 + \text{IRR})^3 + \$5000/(1 + \text{IRR})^4$

$\text{IRR} = 17.11\%$

$\text{IRR}_A > \text{IRR}_B$, so IRR decision rule implies accept project A. This may not be a correct decision however, because the IRR has a ranking problem for mutually exclusive projects. To see if the ranked IRRs lead to the correct decision or not, we need to evaluate the project NPVs.

(b) A: $\text{NPV} = -\$11\,000 + \$4000/1.11 + \$5000/1.11^2$

$+ \$6000/1.11^3 + \$1000/1.11^4 = \$1707.60$

B: $\text{NPV} = -\$11\,000 + \$1000/1.11 + \$6000/1.11^2$

$+ \$5000/1.11^3 + \$5000/1.11^4 = \$1720.25$

$\text{NPV}_B > \text{NPV}_A$, so NPV decision rule implies accept Project B.

(c) Crossover rate: $\$0 = \$3000/(1 + R) - \$1000/(1 + R)^2$
$+ \$1000/(1 + R)^3 - \$4000/(1 + R)^4$; $R = 11.19\%$. At discount rates above 11.19% choose Project A; for discount rates below 11.19% choose Project B; indifferent between A and B at a discount rate of 11.19%.

14 (a) $\text{NPV} = -\$28\text{M} + \$53\text{M}/1.1 - \$8\text{M}/1.1^2 = \$13\,570\,247.93$;

$\text{NPV} > 0$ so accept the project.

(b) $\$0 = -\$28\text{M} + \$53\text{M}/(1 + \text{IRR}) - \$8\text{M}/(1 + \text{IRR})^2$

$\text{IRR} = 72.75\%, -83.46\%$

When there are multiple IRRs, the IRR decision rule is ambiguous; in this case, if the correct IRR is 72.75%, then we would accept the project, but if the correct IRR is – 83.46%, we would reject the project.

Exercise 4.6

Answer to 'Concepts review and critical thinking questions'

8 (a) The profitability index is the present value of cash inflows relative to the project cost. This index is calculated by dividing the present value of future cash flows by the initial cost. As such, it is a benefit/cost ratio, providing a measure of the relative profitability of a project. The profitability index decision rule is to accept projects with a PI greater than one, and to reject projects with a PI less than one.

(b) PI = (NPV + cost)/cost = 1 + (NPV/cost). If a firm has a basket of positive NPV projects and is subject to capital rationing, PI may provide a good ranking measure of the projects, indicating the 'bang for the buck' of each particular project.

Answers to 'Questions and problems'

15 $\text{PI} = [\$900/1.1 + \$350/1.1^2 + \$300/1.1^3]/\$1600 = .833$

$= [\$900/1.15 + \$350/1.15^2 + \$300/1.15^3]/\$1600 = .778$

$= [\$900/1.22 + \$350/1.22^2 + \$300/1.22^3]/\$1600 = .711$

16 (a) $\text{PI}_\text{I} = \$8500(\text{PVIFA}_{9\%,3})/\$15\,000 = 1.434$;

$\text{PI}_\text{II} = \$2500(\text{PVIFA}_{9\%,3})/\$2000 = 3.164$

The profitability index decision rule implies accept project II, since $\text{PI}_\text{II} > \text{PI}_\text{I}$

(b) $\text{NPV}_\text{I} = -\$15\,000 + \$8500(\text{PVIFA}_{9\%,3}) = \$6516.00$

$\text{NPV}_\text{II} = -\$2000 + \$2500(\text{PVIFA}_{9\%,3}) = \$4328.24$

NPV decision rule implies accept I, since $\text{NPV}_\text{I} > \text{NPV}_\text{II}$

(c) Using the profitability index to compare mutually exclusive projects can be ambiguous when the magnitude of the cash flows for the two projects are of a different scale. In this problem, project I is roughly eight times as large as project II and produces a larger NPV, yet the profitability index criterion implies that project II is more acceptable.

Exercise 4.8

Answers to 'Concepts review and critical thinking questions'

1 An opportunity cost is the most valuable alternative that is foregone if a particular project is undertaken. The relevant opportunity cost is what the asset or input is actually worth today, not, for example, what it cost to acquire.

4 Management's discretion to set the firm's capital structure is applicable at the firm level. Since any one particular project could be financed entirely without equity, another project could be financed with debt, and the firm's overall capital structure remain unchanged, financing costs are not relevant in the analysis of a project's incremental cash flows according to the stand-alone principle.

Answers to 'Questions and problems'

1 The \$7 million acquisition cost of the land six years ago is a sunk cost. The \$840 000 current appraisal of the land is an opportunity cost if the land is used rather than sold off. The \$8 million cash outlay and \$250 000 grading expenses are the initial fixed asset investments needed to get the

project going. Therefore, the proper year-zero cash flow to use in evaluating this project is $840 000 + 8 000 000 + 250 000 = $9.09 million.

2 Sales due solely to the new product line are 15 000($10 000) = $150 million. Increased sales of the motor-home line occur because of the new product line introduction; thus 5000($40 000) = $200 million in new sales is relevant. Erosion of luxury motor-coach sales is also due to the new mid-size campers; thus 2000($55 000) = $110 million loss in sales is relevant. The net sales figure to use in evaluating the new line is thus $150 million + $200 million – $110 million = $240 million.

Exercise 4.9

Answers to 'Concepts review and critical thinking questions'

3 It's probably only a mild over-simplification. Current liabilities will all be paid presumably. The cash portion of current assets will be retrieved. Some receivables won't be collected, and some inventory will not be sold, of course. Counterbalancing these losses is the fact that inventory sold above cost (and not replaced at the end of the project's life) acts to increase working capital. These effects tend to offset.

Answers to 'Questions and problems'

3

Sales	$900 000
Variable costs	540 000
Fixed costs	250 000
Depreciation	75 000
EBT	$35 000
Taxes @ 35%	12 250
Net income	$22 750

Exercise 4.10

9 A/R fell by $4000, and inventory increased by $3613, so net current assets fell by $387

$\Delta NWC = \Delta(CA - CL) = -387 - 4153 = -\$4540$

Net cash flow = S – C – ΔNWC = $58 200 – 22 700 – (– 4540) = $40 040

14 Annual depreciation charge = $305 000/5 = $61 000

After-tax salvage value = $60 000(1 – 0.34) = $39 600

OCF = $90 000(1 – 0.34) + 0.34($61 000) = $80 140

NPV = – $305 000 – $27 000 + $80 140(PVIFA$_{10\%,5}$) + [($39 600 + $27 000)/1.1^5] = $13 147

25.

Year	**1**	**2**	**3**	**4**	**5**
Ending book value	$11 356,575	$8,111 650	$5,794 225	$4,139 300	$2 956 075
Units/year	100 000	105 000	110 000	114 000	75 000
Price/unit	$325	$325	$325	$325	$325
Variable cost/unit	$200	$200	$200	$200	$200
Sales	$32 500 000	$34 125 000	$35 750 000	$37 050 000	$24 375 000
Variable costs	20 000 000	21 000 000	22 000 000	22 800 000	15 000 000
Fixed costs	200 000	200 000	200 000	200 000	200 000
Depreciation	1 893 425	3 244 925	2 317 425	1 654 925	1 183 225
EBIT	10 406 575	9 680 075	11 232 575	12 395 075	7 991 775
Taxes	(3 642 301)	(3 388 026)	(3 931 401)	(4 338 276)	(2 797 121)
Net income	6 764 274	6 292 049	7 301 174	8 056 799	5 194 654
Operating CF	$8 657 699	$9 536 974	$9 618 599	$9 711 724	$6 377 879

Year	**0**	**1**	**2**	**3**	**4**	**5**
Operating CF	$0	$8 657 699	$9 536 974	$9 618 599	$9 711 724	$6 377 879
Change in NWC	(600 000)	(650 000)	(650 000)	(520 000)	0	2 420 000
Capital spending	(13 250 000)	0	0	0	0	3 618 376
Total cash flow	($13 850 000)	$8 007 699	$8 886 974	$9 098 599	$9 711 724	$12 416 255

Net present value $8 454 110; IRR 57.52%

Exercise 4.11

(a) Analysis of net cash flow forecasts for Gumnut's woodchip investment are tabled below.

Initial investment

Cost of new machine	$6 000 000
+ Working capital	20 000
= Initial investment	$6 020 000

(b) Incremental operating net cash inflows

Calculation of depreciation expense for new machine

Year	**Cost (1)**	**Applicable depreciation fraction (2)**	**Depreciation [(1) x (2)] (3)**
1 to 6	$6,000,000	1/6	$1,000,000

Calculations (Scenario 1—working capital constant at $20 000)—income statement format

Year	1	2	3	4	5	6
Revenue (a × b)	$2 000 000	$2 400 000	$2 880 000	$3 456 000	$4 147 200	$4 976 640
Less Costs ([a × c] + d)	– 795 000	– 945 000	– 1 125 000	– 1 341 000	1 600 200	1 911 240
Profit before depreciation and tax	1 205 000	1 455 000	1 755 000	2 115 000	2 547 000	3 065 400
Less depreciation (e)	– 1 000 000	– 1 000 000	– 1 000 000	– 1 000 000	– 1 000 000	– 1 000 000
Profit before tax	205 000	455 000	755 000	1 115 000	1 547000	2 065 400
Less income tax @ 40%	– 82 000	– 182 000	– 302 000	– 446 000	– 618 800	– 826 160
Net profit after tax	123 000	273 000	453 000	669 000	928 200	1 239 240
Add depreciation (e)	1 000 000	1 000 000	1 000 000	1 000 000	1 000 000	1 000 000
Operating cash flow	1 123 000	1 273 000	1 453 000	1 669 000	1 928200	2 239 240

(Scenario 1—working capital constant at $20 000)—formula format

Profit before depreciation and tax	1 205 000	1 455 000	1 755 000	2 115 000	2 547 000	3 065 400
Less income tax @ 40%	482 000	582 000	702 000	846 000	1 018 800	1 226 160
Profit before depreciation	723 000	873 000	1 053 000	1 269 000	1 528 200	1 839 240
Add taxes and depreciation (0.40 × $1 000 000)	400 000	400 000	400 000	400 000	400 000	400 000
Operating cash flow	1 223 000	1 273 000	1 453 000	1 669 000	1 928 200	2 239 240

(c) *Terminal cash flows from the project (end of Year 6)*

Proceeds from sale of project equipment	$50 000
– taxes on sale of equipment (40%)	– 20 000
+ Change in net working capital	+ 20 000
terminal cash flow	$50 000

Note: Book value of new machine at end of year 3
= $6 000 000 – (6 × $1 000 000)
= $6 000 000 – $6 000 000 = $0
Tax on sale = 0.40 × ($50 000 sale price – $0 book value)
= 0.40 × $50 000 = $20 000

(d) Calculate the total net cash flows for each year associated with the project.

Year	**0**	**1**	**2**	**3**	**4**	**5**	**6**
Initial investment	$(6 020 000)						
Annual operating cash flows		$1 123 000	$1 273 000	$1 453 000	$1 669 000	$1 928 200	$2 239 240
Terminal cash flows							50 000
Total cash flows	$(6 020 000)	$1 123 000	$1 273 000	$1 453 000	$1 669 000	$1 928 200	$2 289 240

(e) Calculate the initial investment, annual operating net cash flows, terminal cash flows and total annual cash flows for the project if the working capital is calculated at 15 per cent of annual revenue.

Calculations (Scenario 2—working capital 15 per cent of revenue)—income statement format

(i) Initial investment—same as for Scenario 1—$6 020 000

(ii) Calculation of operating net cash inflows—income statement format

Year	**0**	**1**	**2**	**3**	**4**	**5**	**6**
Revenue (a × b)		$2 000 000	$2 400 000	$2 880 000	$3 456 000	$4 147 200	$4 976 640
Less costs ([a × c] + d)		– 795 000	– 945 000	– 1 125 000	– 1 341 000	– 1 600 200	– 1 911 240
Profit before depreciation and tax		1 205 000	1 455 000	1 755 000	2 115 000	2 547 000	3 065 400
Less depreciation (e)		– 1 000 000	– 1 000 000	– 1 000 000	– 1 000 000	– 1 000 000	– 1 000 000
Profit before tax		205 000	455 000	755 000	1 115 000	1 547 000	2 065 400
Income tax @ 40%		– 82 000	– 182 000	– 302 000	– 446 000	– 618 800	– 826 160
Profit after tax		123 000	273 000	453 000	669 000	928 200	1 239 240
Add depreciation		1 000 000	1 000 000	1 000 000	1 000 000	1 000 000	1 000 000
A Operating cash flow		1 123 000	1 273 000	1 453 000	1 669 000	1 928 200	2 239 240
Working capital		– 300 000	– 360 000	– 432 000	– 518 400	– 622 080	nil[a]
2 Working capital recovered[b]		+ 20 000	+ 300 000	+ 360 000	+ 432 000	+ 518 400	+ 622 080
B Change in working capital (1 – 2)		– 280 000	– 60 000	– 72 000	– 86 400	– 103 680	+ 622 080
Annual net cash flows (A + B)[c]		843 000	1 213 000	1 381 000	1 582 600	1 824 520	2 891 320

Notes

(a) In the final year, working capital at completion of the project is zero. It is assumed that all working capital is recovered by the end of the project. In reality, working capital would be run down for any one project by the completion date but there would always be some debts outstanding at the project's termination.

(b) The working capital at the beginning of the period is recovered during the period. Thus in Year 1 working capital at the beginning of the project, $20 000, is recovered. In Year 2, working capital at the beginning of Year 2 (end of Year 1), $300 000, is recovered.

(c) The terminal cash flows applying the working capital recovery method will be $30 000. The working capital recovery is shown as part of the annual net cash flows.

(Scenario 2—working capital 15 per cent of revenue)—formula format

Year	**0**	**1**	**2**	**3**	**4**	**5**	**6**
Profit before depreciation and tax		1 205 000	1 455 000	1 755 000	2 115 000	2 547 000	3 065 400
Less income tax @ 40%		482 000	582 000	702 000	846 000	1 018 800	1 226 160
Profit before depreciation		723 000	873 000	1 053 000	1 269 000	1 528 200	1 839 240
Add Tax × Annual dep'n (0.40 × $1 000 000)		400 000	400 000	400 000	400 000	400 000	400 000
A Operating cash flow		1 123 000	1 273 000	1 453 000	1 669 000	1 928 200	2 239 240
B Change in working capital		– 280 000	– 60 000	– 72 000	– 86 400	– 103 680	+ 622 080
C Annual net cash flows (A + B)		843 000	1 213 000	1 381 000	1 582 600	1 824 520	2 891 320

(iii) Terminal cash flows from the project (end of Year 6):

Proceeds from sale of project equipment	$50 000
– Taxes on sale of equipment (40%)	– 20 000
Terminal cash flow	$30 000

(iv) Calculate the total cash flows for each year associated with the project.

Year	**0**	**1**	**2**	**3**	**4**	**5**	**6**
Initial investment	$(6 020 000)						
Annual operating cash flows		$843 000	$1 213 000	$1 381 000	$1 582 600	$1 824 520	$2 891 320
Terminal cash flows							$30 000
Total cash flows	$(6 020 000)	$843 000	$1 213 000	$1 381 000	$1 582 600	$1 824 520	$2 921 320

The additional investment in working capital required under the second assumption about working capital needed for the business (15 per cent of annual revenue) has a significant impact on the net cash flows generated each year.

Exercise 4.12

5

Sales	$75 000
Variable costs	40 000
Depreciation	2500
EBT	$32 500
Taxes @ 34%	11 050
Net income	$21 450

(a) $OCF = EBIT + D - T = 32\ 500 + 2500 - 11\ 050 = \$23\ 950$

(b) $OCF = S - C - T = 75\ 000 - 40\ 000 - 11\ 050 = \$23\ 950$

(c) $OCF = (S - C)(1 - t_c) + t_cD = (75\ 000 - 40\ 000)(1 - .34) + .34(2500) = \$23\ 950$

(d) $OCF = NI + D = 21\ 450 + 2500 = \$23\ 950$

Exercise 4.13

20 $D_1 = \$350\ 000(0.20) = \$70\ 000$ $D_2 = \$350\ 000(0.32) = \$112\ 000$

$D_3 = \$350\ 000(0.192) = \$67\ 200$ $D_4 = \$350\ 000(0.1152) = \$40\ 320$

$BV_4 = \$350\ 000 - (\$70\ 000 + \$112\ 000 + \$67\ 200 + \$40\ 320) = \$60\ 480$

The asset is sold at a gain to book value, so this gain is taxable.

Aftertax salvage value = $60 480 + ($80 000 – $60 480)(1 – 0.34) = $73 363

OCF1 = $145 000(1 – 0.34) + 0.34($70 000) – $119 500

OCF2 = $145 000(1 – 0.34) + 0.34($112 000) – $133 780

OCF3 = $145 000(1 – 0.34) + 0.34($67 200) – $118 548

OCF4 = $145 000(1 – 0.34) + 0.34($40 320) – $109 409

NPV = – $350 000 – $18 000 + ($119 500 – $3000)/1.15 + ($133 780 – $3000)/1.152 + ($118 548 – $3000)/1.153 + ($109 409 + $27 000 + $73 363)/1.154 = $28 105

Exercise 4.14

19 Aftertax salvage value = $50 000(1 – 0.34) = $33 000

$NPV = \$0 = -\$425\ 000 - \$60\ 000 + OCF(PVIFA_{20\%,5}) + [(\$60\ 000 + \$33\ 000)/1.20^5]$

$OCF = \$447\ 625.39/PVIFA_{20\%,5} = \$149\ 677$

$OCF = \$149\ 677 = [(P - v)Q - FC](1 - t_c) + t_cD$

$\$149\ 677 = [(P - 8.00)(150\ 000) - 150\ 000](1 - 0.34) + 0.34(425\ 000/5); P = \$10.22$

23 Aftertax salvage value = $380 000(1 – 0.34) = $250 800

$NPV = 0 = -\$850\ 000 - \$2,600\ 000 - \$600\ 000 + OCF(PVIFA_{15\%,5}) - \$50\ 000(PVIFA_{15\%,4}) + [(\$250\ 800 + \$800\ 000) / 1.15^5]$

$OCF = \$3\ 670\ 315.59/PVIFA_{15\%,5} = \$1\ 094\ 912.25$

$OCF = \$1\ 094\ 912.25 = [(P - v)Q - FC](1 - t_c) + t_cD$

$\$1\ 094\ 912.25 = [(P - 0.018)(40\ 000\ 000) - 600\ 000](1 - 0.34) + 0.34(2\ 600\ 000/5); P = \$0.06778$

Exercise 4.15

17 $NPV = -\$175\ 000 - \$32\ 500 - \$25\ 000(PVIFA_{15\%,5}) + \$32\ 500/1.15^5 = -\$275\ 145.63$

$EAC = -\$275\ 145.63 / (PVIFA_{15\%,5}) = -\$82\ 080.22$

18 Assuming a carry-forward on taxes:

Both cases: aftertax salvage value = $25 000 (1 – 0.35) = $16 250

Techron I: OCF = – $30 000(1 – 0.35) + 0.35($180 000/3) = – $1500

$NPV = -\$180\ 000 + \$1500(PVIFA_{18\%,3}) + (\$16\ 250/1.18^3) = -\$166\ 848.33$

$EAC = -\$166\ 848.33 / (PVIFA_{18\%,3}) = -\$76\ 738$

Techron II: $\text{OCF} = -\$17\,000(1 - 0.35) + 0.35(\$280\,000/5) = \$8550$

$\text{NPV} = -\$280\,000 + \$8550(\text{PVIFA}_{18\%,5}) + (\$16\,250/1.18^5) = -\$246\,159.66$

$\text{EAC} = -\$246\,159.66 / (\text{PVIFA}_{18\%,5}) = -\$78\,716$

The two milling machines have unequal lives, so they can only be compared by expressing both on an equivalent annual basis which is what the EAC method does. Thus, you prefer the Techron I because it has the lower (less negative) annual cost.

Exercise 4.16

27 (a) Assuming the project lasts four years, the NPV is calculated as follows:

Year	**0**	**1**	**2**	**3**	**4**
Aftertax profit		$1 240 000	$1 240 000	$1 240 000	$1 240 000
Depr. tax shield		380 000	380 000	380 000	380 000
Operating CF		1 620 000	1 620 000	1 620 000	1 620 000
Change in NWC	(1 000 000)	0	0	0	1 000 000
Capital spending	(4 000 000)	0	0	0	0
Total cash flow	($5 000 000)	$1 620 000	$1 620 000	$1 620 000	$2 620 000

Net Present Value $85 343.73

(b) Abandoned after one year:

Year	**0**	**1**
Aftertax profit		$1 240 000
Depr. tax shield		380 000
Operating CF		1 620 000
Change in NWC	(1 000 000)	1 000 000
Capital spending	(4 000 000)	3 155 000
Total cash flow	($5 000 000)	$5 775 000

Net Present Value = – $21 551.72

Abandoned after two years:

Year	**0**	**1**	**2**
Aftertax profit		$1 240 000	$1 240 000
Depr. tax shield		380 000	380 000
Operating CF		1 620 000	1 620 000
Change in NWC	(1 000 000)	0	1 000 000
Capital spending	(4 000 000)	0	2 620 000
Total cash flow	($5 000 000)	$1 620 000	$5 240 000

Net Present Value $290 725.33

Abandoned after three years:

Year	**0**	**1**	**2**	**3**
Aftertax profit		$1 240 000	$1 240 000	$1 240 000
Depr. tax shield		380 000	380 000	380 000
Operating CF		1 620 000	1 620 000	1 620 000
Change in NWC	(1 000 000)	0	0	1 000 000
Capital spending	(4 000 000)	0	0	1 310 000
Total cash flow	($5 000 000)	$1 620 000	$1 620 000	$3 930 000

Net Present Value $118 260.28

The decision to abandon is an important variable when evaluating the NPV of a project.

Review question

Review question 4.1

Case study Merimbula Casino Project

An answer to this case study is presented in the following spreadsheet. In order to derive free cash flow, depreciation charges are added back to the profit after tax. Capital expenditure and additions to working capital are then deducted. In this case working capital is simply incremental accounts payable, which is in effect finance provided by creditors. Therefore, the working capital is a negative amount which is subtracted (i.e. added) to the other cash flow items.

Relevant cash flows:

At 30 June ($,000)	19X1	19X2	19X3	19X4	19X5	19X6	19X7	19X8	19X9	Perpetuity
Profit after tax	0	0	60 279	43 090	44 296	45 025	45 614	48 312	47 098	47 098
plus, Depreciation	0	0	6780	6784	6788	6893	6843	6956	7840	7840
	0	0	67 059	49 874	51 084	51 918	52 457	55 268	54 938	54 938
less, Capex	67 934	134 865	734	645	789	890	900	15 673	678	678
less, Working Capital		(12 654)	(769)	(563)	(137)	(609)	54	(146)	(415)	0
After tax free cash flow	(67 934)	(122 211)	67 094	49 792	50 432	51 637	51 503	39 741	54 675	54 260
Discount rate	14.00%									
Perpetuity value	387 569									
After tax free cash flow plus perpetuity	(67 934)	(122 211)	67 094	49 792	50 432	51 637	51 503	39 741	442 244	
Present values	(59 591)	(94 037)	45 286	29 481	26 193	23 525	20 582	13 931	135 993	
NPV	141 363									
IRR	30.58%									

The working capital amount shown in the perpetuity column is zero because of the assumption that future investment will earn exactly its cost of capital. The $7840 in depreciation expense is assumed to be the amount required in perpetuity to maintain the then existing capital stock.

The inflation rate assumed in calculating the discount rate (6%) is different from that used in generating the cash flows (4%). These need to be consistent, but we are not told which is correct. It is simpler to assume that the 4% inflation assumption is correct, implying that the discount rate should be reduced by 2% to 14%.

The horizon value at the end of year 19X9 ($387 569) is calculated by dividing the perpetuity cash flow ($54 260) by the discount rate of 14%. This represents the estimated sale value of the investment at that time. In practice this may be determined by reference to other measures, such as a price/earnings multiple of expected earnings at that time.

The present values line sums the present value for each year, which provides the net present value (NPV) of $141 363. This indicates that the investment will add value for shareholders, including South New South Wales Investments, who propose to take a 40% share. Their outlay will presumably be 40% of the Capex incurred during the first two years in building the complex.

The analyst must be careful not to double count the contribution of the investors. It is possible than an analyst might see an entry price (which is the proceeds required to cover construction costs) and add this to the capital outflowing addition to the actual construction costs (covered by the proceeds from selling equity). Such an error would probably make the project look undesirable.

The IRR is calculated by a spreadsheet formula on the basis of the 'After tax free cash flow plus perpetuity' line. The IRR of 30.58% is significantly higher than the hurdle rate of 14%, indicating the need for enthusiastic acceptance of the project. In accepting the project the analyst would need to be satisfied that the cash flow projections have not been artificially inflated. Therefore the analyst would require further information on the assumptions underlying the cash flow projections.

A number of other issues could be raised in the context of such a proposal, including:

(a) Why does the horizon value not include an estimate for transaction costs if it is interpreted as an 'exit value'?—on the other hand, is it not a 'continuing value' (a buyer might offer more).

(b) Couldn't an argument be made that during the first two years there is 'construction risk' while the facilities are being built, and this requires a different discount rate from that employed during the operations phase?

(c) No, a value is placed on the potential flexibility in the project, which might have the opportunity of being deferred, expanded or contracted once new information is revealed over time about future prospects.

Capital budgeting: Theory versus practice

M. Freeman & G. Hobbes

Source: Freeman, M. & Hobbes, G. 1991, 'Capital budgeting: Theory versus practice', *Australian Accountant*, Sept., pp. 36–41.

In the area of capital budgeting, there is a wide gap between academic theory and actual practice. Theory and practice could both improve.

Most firms face three major financial decisions: what assets to invest in (the investment or capital budgeting decision); how to finance these assets (the financing decision); and how to reward shareholders (the dividend decision). The theory of how investment decisions are made at times of uncertainty is much better developed and accepted than the theory of financing or the theory of calculating dividends.

In response to changes in market preferences, technology or competition, firms need to continually evaluate new business ventures and replace worn out assets with new ones. A firm's capital budgeting decisions are vital. An inappropriate budgeting decision is a recipe for possible failure, particularly today. Theory is useful, but do executives practise what academics preach when it comes to capital budgeting? Are Australian executives following trends to increased sophistication that have been observed overseas? For example, Pike (1988, p. 349) notes 'very significant increases in capital budgeting sophistication' for the top 140 UK firms from 1980 to 1986. Sophisticated capital budgeting techniques and controls include net present value, probability analysis and post-completion audits. They can be contrasted with naive techniques such as payback period or accounting rate of return.

To find out whether executives give any heed to theory we surveyed the top Australian organisations as ranked on the IBIS Top 1000 Corporate Database. The ranking is based on total revenue of the organisation as at July 1988. This database covers a wide range of industrial sectors and includes listed and unlisted companies, as well as government instrumentalities. We divided the sample into two groups. The first group comprised the top 150 Australian organisations and the second group comprised the organisations ranked from 351 to 500.

Where possible we compare our results with those of McMahon (1981) and Lilleyman (1984). They report results as at 1979 and 1983 respectively. We received 113 usable responses from a possible 289 (i.e. a 39.1 per cent response rate), which compares favourably with 26.4 per cent for Lilleyman (1984) but which is below the 48.2 per cent for McMahon (1981). Care should be taken in direct comparisons of the three surveys because of differences in samples (see note to Table 1) and the different wordings of the questions. In our survey, 73 per cent of respondents were listed and unlisted firms, and the other 27 per cent were either government enterprises or anonymous respondents. The major sectors represented were manufacturing (29%), financial services (18%) and distribution and services (18%).

Capital budgeting techniques

There are six well-documented techniques for evaluating a capital expenditure proposal. Academics generally classify them into 'naive' or 'sophisticated' on the basis of their theoretical rigour. The three procedures that incorporate the concept of discounted cash flows (DCF)—net present value (NPV), internal rate of return (IRR) and profitability index (PI)—are typically referred to as sophisticated. Future cash flows are 'discounted' to reflect the reduction in current value of future cash flows because investors require a return on their investment to cover the time value of money and the risk of their investment.

Non-DCF procedures—including payback, discounted payback and the accounting return on investment (AROI)—are referred to as naive techniques.

Table 1 shows how the popularity of various capital budgeting techniques has varied from 1979 to 1983 to 1989.

It appears that DCF techniques are now used more widely than before and that their use is increasing. This conclusion is supported by the comments of several of our respondents.

Furthermore, academics have distinguished between the three DCF techniques and concluded that 'the NPV criterion is clearly superior to either IRR or PI criterion in maximising shareholder's wealth.' (Clark, Hindelang and Pritchard (1989, p. 120))

Table 1 shows that, although not all executives hold this view, NPV is gaining in popularity. In 1979 only 52 per cent of respondents were using NPV, but by 1989 the number had grown to 75 per cent.

One major change over the decade observable from Table I is the apparent increase in the use of 'other' techniques. Part of the apparent increase is probably due to survey differences. Instead of asking the general question 'What evaluation technique do you use?', we asked respondents to specify their evaluation technique by expenditure type. The theoretical response remains firm - NPV is superior and should be used for all types of expenditures.

Table 2 shows the percentages of respondents using naive and sophisticated techniques for different expenditure types. We have classified the expenditure types into 'typical' and 'atypical' to reflect popular understanding of capital expenditures. We expected particular techniques to be more popular for projects where the information on future costs and revenues is easier to obtain.

Table 1: Capital budgeting techniques over time

	1979 %	1983 %	1989 %
Sophisticated			
NPV	52	44	75
IRR	66	47	72
DCF profitability index	7	N/A	23
Naive			
Payback	53	51	44
AROI	49	31	33
Discounted payback	N/A	18	27
Other	7	10	49

In all three surveys, the aggregate percentage exceeds 100 percent because most respondents used more than one evaluation technique.

McMahon (1981) surveyed the largest 200 listed companies and 20 large unlisted companies as at 1979.

Lilleyman (1984) randomly selected organisations for his survey in 1983. 250 were listed firms, 60 were unlisted firms and 61 were government and semi-government organisations.

The 1989 figures refer to the top 150 organisations in our survey conducted in late 1989.

Two interesting patterns can be identified from Table 2. First, there is higher usage of the naive techniques for atypical investments. This can be seen by focusing on the percentage in the first column relative to the total of all three columns for any given line. For example, at the bottom of the table we see that 92 per cent (i.e. 11% + 20% + 61%) of respondents had typical capital expenditures of one sort or the other (but not necessarily all types). However, only 11 per cent of the 92 per cent (i.e. about 12%) used naive techniques for typical expenditures. In contrast, naive techniques were used 28 per cent of the time for atypical expenditures (i.e. 21% of a total 75%). An explanation for this pattern could be that atypical expenditures were smaller expenditures on average.

The second interesting pattern can be seen in the top half of Table 2. It shows that naive methods are used more often for small capital expenditures than for large capital expenditures.

Table 2: Capital budgeting technique usage by expenditure type

	Naive only %	Sophisticated only %	Sophisticated and naive %
'Typical' capital expenditures			
Replacement of plant and equipment			
Under $100,000	40	19	24
$100,000–$500,000	28	27	29
Over $500,000	14	35	35
New plant and equipment			
Under $100,000	34	24	27
$100,000–$500,000	20	31	33
Over $500,000	11	35	40
Major strategic investments	19	27	33

'Atypical' capital expenditures			
Transport equipment	20	19	19
Company owned property	23	26	14
Investment property	17	22	13
Research and development	27	14	9
Exploration	13	6	6
Typical capital expenditures	11	20	61
Atypical capital expenditures	21	20	34

The naive methods are mainly payback, AROI and 'other'.

The sophisticated methods are primarily NPV and IRR.

Where both naive and sophisticated techniques are used, sophisticated techniques are almost always the primary technique.

If the columns of percentages are added, they come to more than 100.

This is because most respondents used more than one evaluation technique for any given type of capital expenditure.

Calculation of benchmark hurdle rate

It is clear that riskier projects should command a higher return in order to attract investors. Ideally a risk adjusted discount rate should be calculated according to the risk of the project under evaluation. However, risk adjusted discount rates are difficult to measure. A starting point is the firm's weighted average cost of capital (WACC). This reflects the relative current costs and proportion of borrowed and equity funds and it can be used for projects of typical risk to the firm. It is a second best solution because of the potential for incorrect adjustment for risk. But it is clearly preferable to alternatives, such as the cost of borrowing. Using the cost of borrowing is likely to give inappropriate results since potentially unprofitable ventures could then be accepted. A WACC based hurdle rate is always higher than the cost of borrowing because it reflects the contribution of shareholders who require a greater return because their investment is more uncertain or riskier.

We asked executives who use discounted cash flow (DCF) techniques how they calculated their benchmark hurdle rate. Their responses are in Table 3.

Table 3 shows that 62 per cent of the top organisations use the WACC technique. Smaller firms are using WACC less since the effect of including them is to reduce the average to 40 per cent in the last column. Almost the same percentage of respondents (39%) said that they used the cost of borrowing. This contradicts the theory that WACC is preferable to the cost of borrowing. However, the effect on the overall analysis and decision may be quite small, particularly for those who simply use the cost of borrowing plus a margin.

Table 3: Basis for hurdle rate calculation

	1979 %[1]	1989 %[2]	1989 %[3]
Cost of borrowing	9	28	39
Cost of equity	N/A	2	6
Weighted average cost of capital (WACC)	63	62	40

1 For those using DCF techniques over largest 200 firms (n=80) (multiple rates possible)
2 For those using DCF techniques in top 150 sub-sample and excluding government respondents (n=42) to be consistent with McMahon's sample (multiple rates not possible)
3 For those using DCF techniques (n=93) (multiple responses not possible).

Academics are usually quick to point out that a firm's weighted average cost of capital is not always the appropriate benchmark. Brealey and Myers (1988, p. 175), for example, say that 'The company cost of capital is the correct discount rate for projects that have the same risk as the company's existing business but not for those that are safer or riskier than the company's average. The problem is to judge the relative risks of the projects available to the firm.'

We therefore asked executives how they classified the inherent risk of an investment. The majority did distinguish between projects of different risk for evaluation purposes. The most popular classification system (27%) was a subjective assessment of risk as low, medium or high. The next most popular system (23%) was to divide expenditure types into replacement, expansionary and new products.

Interestingly, when respondents were asked whether they then took into account the relative riskiness of a project by adjusting their required hurdle rate, nearly 47 per cent said that they did not.

Estimation risk procedures

In the previous section we looked at the inherent risk of an investment. The uncertainty or variability of investment return results from a firm's operating and financing decisions and can be factored into the analysis through a benchmark hurdle rate. However, errors in the forecasting or estimation process can also cause uncertainty about the return from an investment.

To understand the risks of forecast errors, academics suggest that executives should first undertake sensitivity analysis to identify those variables whose incorrect estimation would result in the greatest impact on NPV. If there are opportunities to reduce these variations at minimal cost (e.g. a long-term sales contract), then they should be undertaken. Alternatively, after further research aimed at identifying the likely distribution of these variables, a probability simulation could be undertaken.

According to Brealey and Myers (1988, p. 229), 'the value of these techniques is to help the manager go behind the cashflow forecast; they help the manager to understand what could go wrong and what opportunities are available to modify the project.'

Table 4 indicates how executives feel about such procedures.

It shows a low usage of the most sophisticated procedure for coping with estimation risk (probability simulation), but a very high usage of sensitivity analysis, particularly by those who used a DCF approach to capital budgeting.

Table 4: Estimation risk procedures

	DCF use		Non-DCF only	
	Number	%	Number	%
Subjective assessment	30	32	4	20
Sensitivity analysis	52	56	1	5
Best and worst comparison	50	54	5	25
Probability simulation	9	19	1	5
Cash flow diversification	1	1	0	0

The actual number of respondents was 93. The aggregate number exceeds the actual number because most respondents gave multiple answers when they were asked why they accepted projects below defined benchmarks.

Use of benchmarks for capital budgeting decisions

Commonsense suggests that few people would argue with the proposition that benchmarks of performance are necessary in order to make effective long-term capital budgeting decisions.

'Management must set benchmarks for the evaluation of capital expenditures. The benchmark for payback is the maximum number of years required by the firm for the complete recovery of the investment in a project. For rate of return, the benchmark is the minimum rate of return required by management ...' (Clark, Hindelang and Pritchard (1989, p. 65)).

We asked managers whether they were in fact setting benchmarks. It turned out that 76 per cent of respondents that did have a capital budgeting procedure accepted projects that did not meet defined company benchmarks. Three per cent of respondents said that they made such decisions 40 per cent of the time. From the remaining 24 per cent, one respondent commented that such projects 'are usually fudged' in order to meet the benchmark.

Why would managers ignore their own benchmarks when these are meant to ensure long-term viability? Table 5 shows that the main reason for this, apart from the mandatory nature of some capital expenditure projects (e.g. pollution control equipment), is the strategic nature of the project under consideration.

Table 5: Reasons for accepting investments that do not meet defined benchmarks

	Number	%
Time constraints	6	9
Information too costly to get	5	7
Strategic reasons	64	94
Mandatory investment	24	35

The actual number of respondents was 68. The aggregate number exceeds the actual because most respondents gave multiple responses when they were asked why they accepted projects below defined benchmarks.

The following comments by respondents shed additional light on management's reasoning and suggest that their financial evaluation does not fully quantify all of a project's potential benefits.

'Most investments are of a strategic nature and are made on the basis of post-acquisition revenues—an industry standard rather than a bridge between theory and practice.'

'Unless the outcome of a particular venture is clear cut, which is rare, then quantitative assessment must also be tempered with qualitative input.'

'The financial evaluation is only part of the evaluation.' (Several major Australian corporates (1989).)

However, recent academic advances suggest that the strategic component of a proposed business venture can be valued quantitatively. Clearly, strategic value varies according to investment opportunity (see Kester (1984)). Brealey and Myers (1988) recommend calculating strategic value from the Black Scholes option pricing model. Practical examples are available in the academic literature (e.g. Brealey and Myers (1988), Brennan and Schwartz (1985), Seigal, Smith and Paddock (1987)).

Conclusion

We have shown that there is considerable divergence between some of the theories developed in the university classroom and the practice in the real world. Some 76 per cent of executives said that their firm accepted projects that failed to meet company benchmarks. The main reason for this was the inability to factor strategic considerations into the evaluation process. More firms, however, are improving their evaluation procedures to account for the time value of money by using a DCF method. More firms use a non-DCF method for atypical projects like research and development or exploration. There is still considerable resistance though in accepting that the NPV method is superior to other DCF methods, such as the IRR method. Some 39 per cent of firms appear to use the cost of borrowing as a suitable benchmark hurdle rate. According to the theorists, a project that covers only the cost of borrowing will not give shareholders a suitable return for their risk exposure and therefore should not be accepted. We saw that nearly half of all respondents use the same hurdle rate for projects of different risk. Finally, we saw that 61 per cent of firms use sensitivity analysis when estimating risk, but only 15 per cent take the next step to probability simulation.

Some academics can be quite disparaging about the continued use of some 'naive' techniques: 'Some managers do use payback in judging capital investments. Why they rely on such a grossly oversimplified concept is a puzzle.' (Brealey and Myers (1988, p. 87)).

Are these results a condemnation of Australian corporate managers? Not really. Using the techniques recommended by theory involves considerable costs. Resources such as time, effort, computers and market research may be quite unjustifiable for small projects. Thus, naive techniques such as payback may be quite reasonable for small projects.

However, there is no doubt that there is plenty of room for improvement in the capital budgeting procedures of most firms, particularly in valuing the strategic component of a project. Academics need to devote more attention to developing simple and practical examples of how the latter can be done and this needs to be followed by the dissemination of their findings to business decision makers.

Footnote

This article reports only part of the total research in progress covering capital budgeting practices. A more rigorous and complete version of this report can be found in *Costly Information, Informed Investors and the Use of Sophisticated Capital Budgeting Techniques*, published in the School of Finance and Economics working paper series at the University of Technology, Sydney.

Project analysis and evaluation

Topic
5

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Suggested answers

Introduction

In Topic 4 we examined capital budgeting with forecasted cash flows being certain. We know that in real-life forecasting is not an accurate science and that future cash flows rarely turn out the way we forecasted them. Have you ever wondered when there are two investors bidding for an investment why one investor pays more for the investment than the other?

In this topic we concern ourselves with the risk (or uncertainty) that the future will not be as we see it presently. We will look at some basic tools to help us consider the critical variables in our forecasts, why they might be critical and what companies can do, knowing that the variables are critical. These tools are called scenario analysis and sensitivity analysis.

We also examine the concept of break-even analysis in an accounting sense, an operating cash flow sense and in a financial sense. These break-even points are very useful for evaluating projects and for budgeting sales volumes and profit margins in those projects.

The break-even points and sensitivity analysis can also both be useful for monitoring the variables that go towards making up the project cash flow, including sales volumes and profit margins, for the whole of the investment's life.

We will also examine the concept of operating leverage, or a company's commitment to fixed expenses, which is a key determinant in break-even analysis and indeed in project evaluation.

Effects of errors in cash flow projections

From the early 1990s Burns Philp Company Limited began to expand the food ingredients division of its business via a series of spice business acquisitions in the United States (Tone's), Canada (Richardson), Argentina (Layco) and India (Cochin Spices). By 1995, Burns Philp had grown from a company supplying 1 per cent of the world spice market to becoming the world's second-largest spice company (behind McCormick of the United States). At June 1997, spices represented an investment of around $850 million. With its rapid growth, the company found itself in fierce competition with McCormick, which had retaliated by heavily discounting its products to protect its market share.

In August 1997, Burns Philp announced that its spice business was for sale and it was writing down the value of its investment in the spice business by $700 million, which represented the estimated loss on the investment. The managing director Ian Clack stated publicly that he was surprised at McCormick's reaction. He said that Burns Philp management had assumed that there was enough business for both firms and they thus forecast cash flows on the basis of little or no retaliation from McCormick. The reliance on this assumption was Burns Philp's major error. It had obviously not estimated the likelihood of McCormick retaliating by lowering its prices and depleting its own returns on investment. The price war decimated the returns Burns Philp could generate on its large investment in spice operations.

Source: Gitman et al. 1998, p. 327.

Objectives

At the completion of this topic you should be able to:

- define the term 'forecasting risk';
- perform scenario and sensitivity analyses;
- calculate an accounting break-even point, a cash break-even point and a financial break-even point;
- calculate the zero or slightly negative NPV after performing a sensitivity analysis;
- define the term 'operating leverage'; and
- outline the concept of reducing the payback period as a way of managing forecasting risk.

Learning resources

Textbook

Ross, S.A., Westerfield, R.W. & Jordan, B.D. 2000
Fundamentals of Corporate Finance
5th edn, Irwin McGraw-Hill, Boston, chapter 11.

Key concepts

The following key concepts are introduced and developed in this topic:

- accounting break-even;
- cash break-even;
- financial break-even;
- forecasting risk;
- operating leverage;
- scenario analysis;
- sensitivity analysis; and
- simulation.

Evaluating NPV estimates

In our attempt to create wealth by searching for new investment opportunities and evaluating them, we are obliged to make estimates or forecasts. The correctness of these forecasts is vital in actually creating wealth. Incorrect forecasts, as we saw in the last topic, and in the introductory reading to this topic, can ruin companies and managerial careers.

Reading

Please read the introduction to Chapter 11 and 'Evaluating NPV estimates' (Section 11.1) in Ross et al. 2000, pp. 317–9. You should note:

- **our project cash flow statement prepared as per the previous topic really provides us with four possibilities: that we really have a positive NPV project; that we think we have a positive NPV project; that we have a negative NPV project; and, that we think we have a negative NPV project (pp. 317–8);**
- **projected cash flows are essentially an average estimate (p. 318);**
- **the expression 'forecasting risk' (or 'estimation risk') is the possibility that errors in the projected cash flows will lead to an incorrect decision (pp. 318–9); and**
- **there are an infinite number of investment possibilities available but there are a finite number of investments that end up yielding a positive NPV result for the investor (p. 319).**

Exercise 5.1

Attempt 'Concepts review and critical thinking question' 1 in Ross et al. 2000, p. 344.

Scenario and other 'what-if' analyses

Asking 'what if' questions comes naturally to most in business. Questions like 'what if we don't get that contract?' or 'what if sales are 20% down on last year?' or 'what if labour costs increase?' arise all the time. They should continue to arise when evaluating investment opportunities and when you study the project cash flow statements. The reason is simple—if you don't ask 'what if?' you may not know what to do if things don't go according to the projected cash flow statement.

Reading

Please read 'Scenario and other what-if analyses' (Section 11.2) in Ross et al. 2000, pp. 320–4. You should note the following points in particular:

- **the initial estimate of the most likely future cash flows is called the 'base case' (p. 320);**
- **that it is desirable to identify variables that may be lower or higher than our base case estimate and note the variables by a 'lower bound' (or 'worst case') and a 'higher bound' (or 'best case') (p. 321);**

- **the term 'scenario analysis' means to determine what happens to the NPV when we ask 'what-if' questions so that the 'scene' changes (pp. 321–2);**
- **the example on p. 321 shows the impact that the worst and best case variable have on NPV;**
- **the term 'sensitivity analysis' means what happens to the NPV as a result of changing one variable only (p. 322);**
- **the example on p. 322 shows the impact of changing one variable at a time on NPV (illustrated graphically in Figure 11.1 on p. 323);**
- **sensitivity analysis points out where the forecasting errors can cause the most damage on NPV but not necessarily what to do (p. 323); and**
- **the term 'simulation analysis' means a combination of scenario and sensitivity analysis (pp. 323–4).**

Exercise 5.2

Attempt 'Chapter review and self-test problem' 11.1 (p. 343), 'Concepts review and critical thinking question' 2 (p. 344) and 'Questions and problems' 3, 4 and 17 (pp. 343–7) in Ross et al. 2000.

Break-even analysis

One of the first calculations that we should do before starting a new business is to calculate how much we expect to sell, the contribution margin we expect to make on each unit sold and the fixed costs we expect to have to cover with that volume and margin. This is called break-even analysis. Clearly, if a new business can't at least break even, then it is probably not a business at all.

Reading

Please read 'Break-even analysis' (Section 11.3) in Ross et al. 2000, pp. 324–30. You should note the following points in particular:

- **the definition and calculation of variable costs are the costs that vary with changes in the volume sold (p. 324);**
- **the definition of fixed costs is the costs that do not change with changes in the volume sold (p. 326);**
- **the definition of total costs is variable plus fixed costs (p. 326);**
- **the definition of marginal cost (or incremental cost) is the cost of the product (or service) after the fixed costs have been covered (p. 326);**
- **the definition of marginal (or incremental) revenue is the revenue earned over and above the marginal cost (p. 327);**
- **the calculation of an accounting break-even point is the point at which our net income is zero (pp. 327–9); and**
- **the reasons why the financial manager is interested in the accounting break-even (pp. 329–30).**

Equation 11.1 (Ross et al. 2000, p. 329) shows the formula for calculating the accounting break-even point. The formula identifies the volume of units that needs to be sold to cover the fixed costs plus the depreciation expenses divided by the contribution margin per unit. The calculation is easy and very useful indeed.

Let's look at an example of a company which sells one type of ballpoint pen. Assume it has fixed costs (FC) of $100 000 per annum, depreciation expenses (D) of $20 000 and an expected contribution margin (CM) of $2 per pen. Remember the contribution margin is the selling price less the variable cost. The accounting break-even analysis will tell the financial manager that:

Break-even units = ($100 000 FC + $20 000 D) / $2CM per pen
= 60 000 pens

If the company can sell 60 000 or more pens per year, it will make a profit; if it can't, then it will make a loss.

The variant to the break-even volume calculation is the break-even in revenue (or sales dollars) calculation. The break-even in revenue tells us how much in revenue must be earned to break even. The break-even revenue calculation is simply the fixed costs plus the depreciation expenses divided by the average contribution margin percentage. The contribution margin percentage is the selling price per unit less the variable cost, divided by the selling price. Assume in the above example that the selling price of the pens is $5 and the variable cost is $3. The contribution margin is $2 (as before) but the contribution margin percentage is 40%.

In our example, the fixed costs and the depreciation expenses are as before and this time the average contribution percentage is 40%. What is the break-even revenue figure?

Break-even revenue = ($100 000 FC + $20 000 D) / 0.40 (or 40%)
= $300 000.

Can you see the relationship in the above two break-even calculations? Multiply the break-even units calculation of 60 000 units by the selling price of $5 and you have the break-even in revenue of $300 000.

These break-even units or revenue figures are not only good as yearly 'must do' figures but also as weekly, monthly or quarterly targets. The 60 000 units per annum to break even in an accounting sense means the company must sell on average 1154 pens per week, 5000 pens per month or 15 000 pens per quarter all at the average $2 per pen margin. Similarly, revenue should on average be $5769 per week, $25 000 per month or $75 000 per quarter.

Attempt 'Questions and problems' 8 in Ross et al. 2000, p. 346.

Exercise 5.3

Operating cash flow, sales volume and break-even

Although accounting break-even and a cash-based break-even are useful tools for managers, a financial break-even, or one that considers the time value of money, is going to be of even greater value.

Reading

Please read 'Operating cash flow, sales volume, and break-even' (Section 11.4) in Ross et al. 2000, pp. 330–5. You should note the following points in particular:

- **the operating cash flow is the contribution margin times the volume less the fixed costs (Equation 11.2, p. 332);**
- **the definition and formulation of the cash break-even point is the fixed costs divided by the contribution margin per unit of sales (p. 333);**
- **the definition and formulation of the financial break-even is the sales level that results in a zero NPV (pp. 333–4); and**
- **Figure 11.5 on p. 332 illustrates graphically the three break-even points—the accounting break-even, the cash break-even and the financial break-even.**

Exercise 5.4

Attempt 'Chapter review and self-test problem' 11.2 (p. 343) and 'Questions and problems' 7 and 10 (pp. 346–7) in Ross et al. 2000.

Using sensitivity analysis in managing a project

The accounting break-even point calculated for the Wettway Sailboat Corporation example in Ross et al. (2000, pp. 330–1) gave us some measure of comfort initially. The comfort came in the idea that to cover all its fixed costs (including depreciation) and to break even in an accounting sense, Wettway needed to sell only 60 boats, but it thought that it could sell 85. This comfort level went higher with the calculation of the cash break-even suggesting that only 25 boats needed to be sold to cover Wettway's fixed costs (not including depreciation). The comfort turned to discomfort as soon as we calculated the financial break-even, which suggested that 84 boats needed to be sold. The 84 boats break-even was terribly close to the 85 that Wettway thinks it can sell.

These are all useful tools in evaluating an investment. Given certain fixed costs and certain contribution margins we could work out the sales volumes necessary to achieve break-even. But what if the fixed costs and the contribution margins (made up of selling price less variable cost) don't stay as predicted for the life of the project? We should return to our old friend, the sensitivity analysis.

You should recall from earlier in this topic that the sensitivity analysis involves changing variables to determine how critical these variables are to the NPV. Just as the break-even analyses were concerned with 'downside', or 'how far down our estimates can go', sensitivity analysis can also be useful in helping us determine 'how far down our estimates can go' before we have a negative NPV.

Let's revisit the Wettway example in Ross et al. (2000, p. 330). Assume that the tax rate for the company is still zero and all the other figures are as outlined in the base-case example on that page. Wettway would have the following project cash flow statement:

Table 5.1: Wettway project cash flow statement

	Year 1	Year 2	Year 3	Year 4	Year 5
Estimated unit sales	85	85	85	85	85
Est. selling price	40 000	40 000	40 000	40 000	40 000
Est. variable cost	20 000	20 000	20 000	20 000	20 000
Revenue (1)	3 400 000	3 400 000	3 400 000	3 400 000	3 400 000
less					
Var. cost (2)	1 700 000	1 700 000	1 700 000	1 700 000	1 700 000
Contribution margin	1 700 000	1 700 000	1 700 000	1 700 000	1 700 000
Fixed cost (3)	500 000	500 000	500 000	500 000	500 000
Depreciation	700 000	700 000	700 000	700 000	700 000
Net profit	500 000	500 000	500 000	500 000	500 000
Tax payments Assumed zero (4)	0	0	0	0	0
Operating CF (1)–(2)–(3)–(4)	1 200 000	1 200 000	1 200 000	1 200 000	1 200 000
Note our top down approach starting at Sales (1) and subtracting the cash.					
Required return 20% PV factor	0.8333	0.6944	0.5787	0.4823	0.4019
(Note these present value factors came from Table A2, on pp. 674–5 of Ross et al. 2000)					
PV inflows ('000s)	999 960	833 280	694 440	578 760	482 280
Total PV inflows		3 588 720			
Less initial investment		3 500 000			
Net present value		88 720			
(Note this is the NPV of $88,720 on p. 331 of Ross et al. 2000)					

Our concern now is to try to calculate how far down our estimates of variables can go before we have a zero or perhaps slightly negative NPV. The reason for this is simple. This tells us the how much movement there might be before our 'value-creating' project is not value creating, but value destroying. It also tells us how much *managing* must be done. For example, if we find out in the above example that the selling price can fall to around $39 650 before we have a zero NPV project, then we know we don't have much leeway in dropping our price for the *whole life of the project.*

Let's consider each of the variables to see what impact they can have on the NPV and how much managing they need. The variables are sales volume, selling price, unit variable costs, fixed costs and even required rates of return.

Exercise 5.5

Prepare the above spreadsheet for Wettway and change one variable at a time to get as close as you can to a zero NPV for each variable. Check your answers below.

. If you go back to the spreadsheet above and simply change these variables one by one, you will find that:

> At a sales volume of 83 units per year, Wettway's project delivers a negative $30 904 NPV.
>
> At a sales volume of 84 units per year, Wettway's project delivers a positive $28 908 NPV.
>
> At a selling price of $39 600, Wettway's project delivers a negative $12 960 NPV.
>
> At a selling price of $39 700, Wettway's project delivers a positive $12 459 NPV.
>
> At a unit variable cost of $20 400, Wettway's project delivers a negative $12 960 NPV.
>
> At a unit variable cost of $20 300, Wettway's project delivers a positive $12 460 NPV.
>
> At a fixed cost of $530 000 per year, Wettway's project delivers a negative $998 NPV.
>
> At a fixed cost of $525 000 per year, Wettway's project delivers a positive $13 995 NPV.
>
> At a required rate of return of 23%, Wettway's project delivers a negative $132 440 NPV.

The forecasting risk is very high and our margin for error is very low. If Wettway did, however, get into the project, then with the above information, the managers are better equipped to manage. They will know that their sales volume must be at least 84 units per year or around seven boats every month for the five-year life of the project.

They would know that they can't discount the boats much either. A discount of around $300 on average per boat is all that can be given for the five-year life of the project.

They would know also that unit variable costs can't go $400 more than estimated for the life of the project. Finally, with the aid of the above information, they would know that the fixed costs cannot go to $530 000 per year for the five-year life of the project.

We haven't yet looked at the required rate of return. The present required rate of 20% is the required rate of return and hence our discount rate for the whole project life. This is a long time. By doing a sensitivity analysis on the required rate of return we find out that it can't go much higher than the estimated 20% either. We will discuss discount rates in more detail later on in this unit.

We won't worry about depreciation expenses (because it's not very likely that we would change our depreciation method and it is unlikely the government would allow you to increase the depreciation claim on existing assets acquired) and tax payments (because in this instance we've assumed a zero tax payment). You could, however, use the sensitivity analysis above to see what impact these variables make on NPV if you wanted to.

Note also that sometimes you might like to consider grouped items, for example sales volumes and selling price equals sales revenue. Similarly, sales volume (assuming sales volume equals production volume) and unit variable costs equals total variable costs. Likewise, you might look at selling price less unit variable cost to arrive at unit gross margin. You might also look at revenue less variable cost to arrive at total gross margin. These grouped items can be very helpful.

For example, look again at the Wettway example. So long as the total revenue is $3 400 000 per year it may not matter what combination of selling price and unit sales are achieved, so long as it's achieved. We may be happy selling 100 boats at $34 000 per boat rather than 85 boats at $40 000. The total revenue figure is the same and perhaps our marketing team might find it easier marketing the boats at $34 000 rather than $40 000. This approach is fine so long as the variable costs per unit also stay at a total $1 700 000. This means that the variable cost per unit would have to decrease to $17 000 per unit. If they cannot, because perhaps to sell 100 boats would still cost $20 000 per unit, Wettway will be in trouble in terms of NPV. For this reason it is often better to look at the total contribution. We know that we are happy to receive $3 400 000 in total revenue so long as total variable costs remain at $1 700 000. This gives a total gross contribution margin of $1 700 000. A sensitivity analysis on this total contribution can then be performed.

Change the contribution margin to $1 600 000 and see what the NPV equals. It should equal negative $210 340. Not a good result, so it is critical, once again, that this contribution margin be managed for the life of the project.

Now that we've been able to manipulate the spreadsheet by changing one variable at a time and seeing the resultant NPV, it would be handy to graph the results. Below are some graphs that should visually help the managers of Wettway manage this new project. Remember, negative NPVs are to be avoided.

Table 5.2

Boat sales	85	NPV	88 720
Boat sales	83	NPV	– 30 904
Fixed costs	500 000	NPV	88 720
Fixed costs	530 000	NPV	– 998
Discount rate	20%	NPV	88 720
Discount rate	23%	NPV	– 132 440
Cont. margin	1 700 000	NPV	88 720
Cont. margin	1 600 000	NPV	– 210 340

Exercise 5.6

Find out if your organisation uses sensitivity analysis and/or break-even analysis when evaluating investment proposals. If it does not, ask why not.

Ask also if your organisation uses sensitivity analysis to manage projects after the investment has been made. If it does not, ask why not.

Operating leverage

Operating leverage is the degree to which a company is committed to its fixed costs. The finance manager needs to worry about the fixed costs of the company and how these impact on the operating profits and operating cash flows, as and when sales change.

Leverage—A business perspective

Theodore French—Senior Vice President and Chief Financial Officer, Case Corporation

Leverage is the key to managing a company, particularly one that operates in a cyclical environment with significant price volatility. Case is a leading worldwide designer, manufacturer, marketer and distributor of farm and construction equipment. Its market fluctuates with the economy, and worldwide agricultural markets are undergoing significant structural change. The North American market alone declined approximately 40 per cent during the 1980s.

As a result, Case and many other agricultural capital goods companies entered the 1990s with a high degree of operating leverage (use of fixed operating costs to increase returns) and excess manufacturing capacity. This adversely affected our financial performance: Case's net sales decreased from $5.4 to $3.8 billion during the 1991–1992 recession, and between 1990 and 1992 earnings before interest and taxes dropped from $186 million to a $412 million loss.

During 1991, Case closely evaluated its fixed investment. To be profitable throughout the business cycle, we needed to drastically reduce capacity and create a more variable cost structure—in other words, reduce operating leverage.
A $1.4 billion restructuring program that outsourced nonstrategic components and significantly reduced manufacturing floor space cut over $400 million in annual fixed cost by 1995. Case reduced its breakeven net sales by 50 per cent.

...

Leverage is the key to operating our business successfully. Decisions that change or establish leverage influence decisions in all operational areas of the business, and have a lasting and material impact on the company's financial performance.

Theodore (Ted) R. French is Senior Vice President and Chief Financial Officer of Case Corporation. He earned his bachelor's degree in Economics and his M.B.A. from the University of Georgia.

Source: Gitman 1997, p. 467.

Reading

Please read 'Operating leverage' (Section 11.5) in Ross et al. 2000, pp. 335–8. You should note:

- **the basic idea that companies looking at a project to introduce new products (or services) have two basic ways of producing and delivering a product: (a) by buying the necessary equipment, buying the raw materials to make the product, employing people to make and deliver the product etc.; or (b) by subcontracting the operations out (p. 335);**

- the fewer fixed costs the company has, the less risk it has if there are large errors in the forecasted cash flows (p. 335);
- the definition of the degree of operating leverage is the percentage change in operating cash flow compared to the percentage change in sales volume (pp. 335–6 and Equation 11.4);
- the calculation of the degree of operating leverage (pp. 336–7); and
- that having fewer fixed costs may decrease the NPV but it is likely to also decrease the accounting break-even, cash break-even and financial break-even points (pp. 337–8).

Exercise 5.7

Attempt 'Concepts review and critical thinking questions' 6 and 7 (p. 345) and 'Questions and problems' 9, 11, 12, 13, 14 and 15 (pp. 346–7) in Ross et al. 2000.

Managerial options and capital rationing

We discussed the concept of a capital budgeting audit in the previous topic and suggested that companies should review their investments regularly. At that stage we also put forward the idea that companies, after having made investments, should consider selling investments if the selling price was higher than the present value of the future cash flows. In this section we discuss these issues in more detail.

We also discuss the concept of capital rationing, or where the supply of capital is limited.

Reading

Please read 'Additional considerations in capital budgeting' (Section 11.6) in Ross et al. 2000, pp. 338–42. You should note:

- the need to identify the variables that may cause a project not to break even (pp. 338–9);
- the possibility of expanding, or increasing, the size of positive NPV projects (p. 339);
- the possibility of scaling back the size or even abandoning projects that aren't as valuable as our project cash flow statement initially estimated (p. 340);
- the option of waiting before making an investment or perhaps suspending operations (p. 340);
- the example of the value of an option to abandon (pp. 340–1);
- the possibility of 'testing the water' investments before major large-scale investment funds are committed (p. 341);
- the definition of capital rationing, or not having the available finance to invest in positive NPV investments (p. 342); and
- the difference between soft and hard capital rationing (p. 342).

The following article on the huge multinational consumer products company Johnson & Johnson suggests that it plans to make investments knowing very well that many of these investments will fail.

Taking risks at Johnson & Johnson

Johnson & Johnson is a multinational company with a strong presence in the Australian market, best known for 'Johnson's Baby Powder'. This article describes their attitude to justifiable risk in research and development (R&D).

Taking risks is not always risky—in some cases it is simply the prudent thing to do. Although one isolated R&D project may be risky by itself, an R&D program may not have much risk at all. Although most R&D projects are doomed to failure, enough of them make it and produce profits at a high enough level to make the entire R&D program profitable.

During the 1980s, James Burke has quintupled research spending at Johnson & Johnson, encouraged the introduction of more than 200 new products during a five-year period, and instituted a philosophy of innovation that allows managers to fail. As J & J's chief executive, Burke has spent thirty years nurturing innovation through new products.

His first stay at J & J lasted only one year. In 1953 he left, feeling stifled and bored. Before his departure, Burke suggested that J & J create a new-products division. In less than three weeks, he was back to head this division. After accepting, Burke set about developing new ideas, until he was summoned to the office of the chairman, General Robert Wood Johnson. It seems that one of Burke's innovations, a children's chest-rub, had failed dismally.

General Johnson asked, 'Are you the one who cost us all that money?' Burke nodded. The General said, 'Well, I just want to congratulate you. If you are making mistakes, that means you are making decisions and taking risks. And we don't grow unless you take risks.'

Today Burke is still spreading the gospel of innovation. 'Any successful growth company is riddled with failures, and there's just not any other way to do it,' he explains. 'We love to win, but we also have to lose in order to grow.' Burke believes that innovation can be nurtured through creative conflict, by encouraging an entrepreneurial urge and open debate on new ideas among his people.

Source: Petty et al. 1996, p. 300.

Exercise 5.8

Attempt 'Concepts review and critical thinking questions' 8, 9 and 10 (p. 345) and 'Questions and problems' 20 and 21 (p. 348) in Ross et al 2000.

Reducing the payback period

As discussed in the previous topic, some companies continue to use the payback period for making investment evaluations. One technique that these companies may use to help them reduce errors in estimating is to subjectively reduce the payback period. For example, if a company suggests that it will not invest in projects whose payback is less than say four years, one way of reducing the errors in estimating is to reduce the payback back to, for example, three years.

You already know the theoretical limitations of this technique, but reducing the required payback period for projects can be logical in present value terms.

Increasing the emphasis on early cash flows can be a useful technique for managing forecasting risk. The later cash flows, which would normally be the most risky, are ignored. If payback is to be used, reducing the required payback time for risky investments can make good sense.

Summary

We know that net present value analysis is the best way to analyse investment proposals but there are still many concerns that can creep in to this analysis and make our NPVs wrong.

In this topic we looked at some of the tools that will help us identify the variables that are critical to the success of the investment and how critical those variables might be. We also looked at break-even analysis in three forms that are very useful in determining critical sales volumes.

We also discussed the concept of operating leverage and how a firm's commitment to fixed costs can impact greatly on the operating cash flow when there are changes in sales volumes.

Even though we've identified many problems in making investment decisions, go back to the question asked in the first paragraph of this topic on why the winning bidder paid more for an investment than the losing bidder. The answer, in most instances, is that the winning bidder forecasts the future cash flows of the investment higher than the losing bidder. The real winner, however, may not necessarily be the one that paid most for the investment. The real winner is the one who has asked the more appropriate questions in order to prepare the project cash flow statement.

Review question

To help reinforce what you have studied in this topic attempt the following review question. You should spend around 20–30 minutes on this task.

Review question 5.1

Complete 'Questions and problems' 5 (p. 346) in Ross et al. 2000.

References

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Suggested answers

Topic
5

Exercises

Exercise 5.1

1. Forecasting risk is the risk that a poor decision is made because of errors in projected cash flows. The danger is greatest with a new product because the cash flows are probably harder to predict.

Exercise 5.2

2. With a sensitivity analysis, one variable is examined over a broad range of values. With a scenario analysis, all variables are examined for a limited range of values.

3.

	Base case	Lower bound	Upper bound
Unit sales	80 000	68 000	92 000
Price/unit	$1460	$1241	$1679
Variable cost/unit	$140	$119	$161
Fixed costs	$6 000 000	$5 100 000	$6 900 000

Scenario	Unit sales	Unit price	Unit variable cost	Fixed costs
Base	80 000	$1460	$140	$6 000 000
Best	92 000	$1679	$119	$5 100 000
Worst	68 000	$1241	$161	$6 900 000

4. An estimate for the impact of changes in price on the profitability of the project can be found from the sensitivity of NPV with respect to price; $\Delta NPV/\Delta P$. This measure can be calculated by finding the NPV at any two different price levels and forming the ratio of the changes in these parameters. Whenever a sensitivity analysis is performed, all other variables are held constant at their base-case values.

17. OCF @ 110 000 units = [($24 – $15) (110 000) – $175 000] (0.66) + 0.34($375 000/3) = $580 400

OCF @ 111 000 units = [($24 – $15) (111 000) – $175 000] (0.66) + 0.34($375 000/3) = $586 340

$\text{Sensitivity} = \Delta\text{OCF}/\Delta Q = (\$586\,340 - \$580\,400) / (111\,000 - 110\,000) = +\,\$5.94$

OCF will increase by $5.94 for every additional unit sold.

Exercise 5.3

8. (1): $Q_a = 133\,333 = (\$175\text{K} + D) / (\$32 - \$27);\ D = \$491\,665$

   (2): $Q_a = 130\,000 = (\$3\text{M} + \$1.25\text{M}) / (P - \$50);\ P = \$82.69$

   (3): $Q_a = 5263 = (\$125\text{K} + \$80\text{K}) / (\$100 - v);\ v = \$61.05$

Exercise 5.4

7. (1): $Q_c = \$16\text{M} / (\$1.9\text{K} - \$1.75\text{K}) = 106\,667;$
   $Q_a = (\$16\text{M} + \$7\text{M}) / (\$1.9\text{K} - \$1.75\text{K}) = 153\,334$

   (2): $Q_c = \$60\text{K} / (\$30 - \$26) = 15\,000;$
   $Q_a = (\$60\text{K} + \$150\text{K}) / (\$30 - \$26) = 52\,500$

   (3): $Q_c = \$300 / (\$7 - \$2) = 60;$
   $Q_a = (\$300 + \$365) / (\$7 - \$2) = 133$

10. $Q_c = \text{FC} / (P - v);\ 11\,000 = \$110\,000 / (P - \$20);\ P = \$30$
    $Q_a = (\text{FC} + D) / (P - v);\ 16\,000 = (\$110\,000 + D) / (\$30 - \$20);\ D = \$50\,000$
    $I = (D)\,(N);\ I = 5(\$50\,000) = \$250\,000$
    $\text{OCF} = I / (\text{PVIFA}_{18\%,5}) = \$250\,000 / 3.1272 = \$79\,944.46$
    $Q_f = (\$110\,000 + \$79\,944.46) / (\$30 - \$20) = 18\,994.45$

Exercise 5.7

6. It makes wages and salaries a fixed cost, driving up operating leverage.

7. Fixed costs are relatively high because airlines are relatively capital intensive (and airplanes are expensive). Skilled employees such as pilots and mechanics mean relatively high wages which, because of union agreements, are relatively fixed. Maintenance expenses are significant and relatively fixed as well.

9. $Q_a = [\$4000 + (\$6000 / 3)] / (\$68 - \$33) = 172;$
   $Q_c = \$4000 / (\$68 - \$33) = 115$

   $\text{NPV} = 0$ implies $\$6000 = \text{OCF}\,(\text{PVIFA}_{17\%,3});$
   $\text{OCF} = \$2715.44$

   $Q_f = (\$4000 + \$2715.44)(\$68 - \$33) = 192;$
   $\text{DOL} = 1 + (\$4000 / \$2715.44) = 2.473$

11. $\text{DOL} = \%\Delta\text{OCF} / \%\Delta\text{Q};\ \ \%\Delta\text{OCF} = 2[(35\text{K} - 30\text{K}) / 30\text{K}] = 33.33\%$
    The new level of operating leverage is lower since FC/OCF is smaller.

12. $\text{DOL} = 2 = 1 + \$150\,000 / \text{OCF};\ \text{OCF} = \$150\,000;$
    $\text{New OCF} = \$150\,000(1.3333) = \$200\,000$
    $\text{New DOL} = 1 + (\$150\,000 / \$200\,000) = 1.75$

13. $\text{DOL} = 1 + (\$20\,000 / \$55\,000) = 1.3636$
    $\%\Delta Q = (7300 - 7000) / 7000 = 4.29\%$

    $\%\Delta\text{OCF} = \text{DOL}\,(\%\Delta Q) = 1.3636(.0429) = 5.85\%$
    $\text{New OCF} = \$55\,000\,(1.0585) = \$58\,217.50$

    DOL at 7300 units $= 1 + (\$20\,000 / \$58\,217.50) = 1.3435$

14. DOL = 4.0 = 1 + FC/OCF; FC = (4.0 – 1) $7000 = $21 000
%ΔQ = (11 000 – 10 000) / 10 000 or (9000 – 10 000) / 10 000 = ±10.0%
%ΔOCF = 4.0 (±10.0%) = 40%
OCF at 11 000 units = $7000 (1.40) = $9800; OCF at 9000 units
= $7000 (0.60) = $4200

15. DOL at 11 000 units = 1 + $21 000 / $9800 = 3.1429
DOL at 9000 units = 1 + $21 000 / $4200 = 6.0000

Exercise 5.8

8. With oil, for example, we can simply stop pumping if prices drop too far, and we can do so quickly. The oil itself is not affected; it just sits in the ground until prices rise to a point where pumping is profitable. Given the volatility of natural resource prices, the option to suspend output is very valuable.

9. The implication is that they will face hard capital rationing.

10. Euro Disney's experience illustrates that profitability is *everybody's* concern. Finance and marketing are strongly connected because revenues are the single most important determinant of cash flow and profitability, and marketing is responsible, in large part, for revenue production. As we have seen in many places, revenue projections are a key part of many types of financial analysis; such projections are best developed in cooperation with marketing.

20. (a) NPV_{base} = – $3 500 000 + $780 000($PVIFA_{16\%,10}$) = $269 917.43

(b) $2 500 000 = ($130)Q($PVIFA_{16\%,9}$); Q = 2 500 000 / [130 (4.6065)] = 4175

Abandon the project if $Q < 4175$ units, because NPV (abandonment) > NPV (project CF's)

(c) The $2 500 000 is the market value of the project. If you continue with the project in one year, you forego the $2 500 000 that could have been used for something else.

21. (a) Success: PV future CF's = $130(8000)($PVIFA_{16\%,9}$) = $4 790 805.63

Failure: from #20, Q = 4000 < 4175 so you will abandon the project; PV = $2 500 000

Expected value of project at Year 1 = [($4 790 805.63 + $2 500 000) / 2] + $780 000 = $4 425 402.82

NPV = – $3 500 000 + ($4 425 402.82) / 1.16 = $315 002.43

(b) If we couldn't abandon the project, PV future CF's = $130(4000) (PVIFA16%,9) = $2 395 402.82

Gain from option to abandon = $2 500 000 – $2 395 402.82 = $104 597.18

Option is 50% likely to occur: value = (.50)($104 597.18) / 1.16 = $45 084.99

Review question

Review question 5.1

5. (a) D = \$840 000 / 6 = \$140 000 per year

Q_a = (\$800 000 + \$140 000) / (\$32 – \$18) = 67 143 units

DOL = 1 + FC / OCF = 1 + FC / D = 1 + [\$800 000 / \$140 000] = 6.7143

(b) $\text{OCF}_{\text{base}} = [(P - v)Q - FC](1 - t) + tD$

$= [(32 - 18)(125\text{K}) - 800\text{K}](0.65) + 0.35(140\text{K}) = \$666\,500$

$\text{NPV}_{\text{base}} = -\$840\,000 + \$666\,500(\text{PVIFA}_{15\%,6}) = \$1\,682\,358$

Say Q = 135 000: $\text{OCF}_{\text{new}} = [(32 - 18)(135\text{K}) - 800\text{K}](0.65) + 0.35(140\text{K}) = \$757\,500$

$\text{NPV} = -\$840\,000 + \$757\,500\,(\text{PVIFA}_{15\%,6}) = \$2\,026\,746$

$\Delta\text{NPV}/\Delta\text{S} = (\$2\,026\,746 - \$1\,682\,358)/(135\,000 - 125\,000) = +\$34.439$

If sales were to drop by 500 units, then NPV would drop by \$34.439(500) = – \$17 220

(c) Say v = \$17: $\text{OCF}_{\text{new}} = [(32 - 17)(125\text{K}) - 800\text{K}](0.65) + 0.35(140\text{K}) = \$747\,750$

$\Delta\text{OCF} / \Delta v = (\$747\,750 - \$666\,500) / (\$17 - \$18) = -\$81\,250$

If variable costs fell by \$1 then, OCF would rise by \$81 250

Risk and return

Topic
6

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Suggested answers

Readings

Introduction

We have spent considerable time in the previous topics discussing how and why we should discount future cash flows by a required rate of return. The required rate of return chosen in those previous topics 'seemed' relatively appropriate but we gave no reason for the selection of that required rate of return. What we haven't yet covered is the issue of what determines a required rate of return and why that rate is 'appropriate'.

There is an old rule in finance that suggests the higher the risk, the higher the required rate of return. This intuitively makes sense, but what do we really mean by return and risk? Are they measurable? How are they measured?

In this topic we are going to look at investments in financial assets initially to see how they have performed historically (in the USA and in Australia) in terms of risk and return. Financial assets you will recall are shares (or stocks) and bonds (or other longer term debt instruments).

Are you taking enough risks?

Professional investment advisers and magazines supply investors with empirical evidence about the historical relationship between risk and return. *Personal Investment,* a popular investment magazine, featured an article examining risk and return relationships. An extract is given … below.

Risk and performance

Basically, if you want your portfolio to improve its performance, you will probably have to increase your exposure to riskier assets. The relationship between risk and return is not always hard and fast. The accompanying table from W.M. Mercer details the five and 10-year return and risk figures …

Risk and return

30 September 1996

Australian shares	Return % 5 years	Return % 10 years	Risk % 5 years	Risk % 10 years
All Ords. Accum.	12.3	10.9	13.7	20.5
All Industrials Accum.	13.0	11.4	13.2	19.5
All Resources Accum.	10.9	10.0	17.9	25.6
50 Leaders Accum.	10.8	11.5	14.4	21.6
Small Ordinaries Accum.	14.9	n.a.	12.7	n.a.
Property				
Listed property trusts	12.4	11.0	9.3	12.3
Mercer Direct Property	0.7	6.4	3.8	5.4
Australian fixed interest and cash				
Government bonds	10.9	13.6	6.1	5.5
Composite	11.1	13.8	5.8	5.4
Cash	6.8	10.9	0.4	2.2
Overseas shares $A				
MSCI World	11.0	8.0	12.0	16.0

You can see that the key local market indicator, the All Ordinaries Accumulation Index, has generated 12.3 per cent annual return over five years, compared with 10.9 per cent over 10 years. Its risk levels were 13.7 per cent and 20 per cent respectively …

Compare those results with fixed-interest risk and return figures. The bond market has produced annual returns of 11.1 per cent over five years and 13.8 per cent over 10 years. The corresponding risk figures are 5.8 per cent (five years) and 5.4 per cent (10 years) …

If you look only at these figures, you might be tempted to ask, why bother with the pain of share investments? The standard answer is that every time a group of statistics like this is considered—even over reasonable periods of time—there appear to be anomalies. The 10-year period in this case included the huge interest rates that were a feature of the late 1980s and early 1990s. In contrast, the period also includes the market crash in 1987. If the time horizon is increased to 20 years, the average return on Australian equities has been 16 per cent a year with volatility of 20 per cent, compared with Australian fixed-interest return of 13.1 per cent a year, and volatility of 5.7 per cent. These figures are more in line with the long-run trends …

In this [topic] we develop and describe the relationship between risk and return and describe how firms may attempt to minimise risk without sacrificing return. Risk and return are the key determinants of share value.

Source: Gitman 1998, p. 201.

Objectives

At the completion of this topic you should be able to :

- understand the concept that 'returns' from an investment constitute income returns and possibly capital returns;
- outline the history of returns from shares, long-term government debt (bonds) and short-term government debt (bills) in the USA;
- outline the history of returns from shares, long term government bonds and bank bills in Australia;
- calculate variances and standard deviations for shares, bonds and bills as measures of risk;
- explain the concept of the efficient market;
- describe the concept that diversification can reduce portfolio risk;
- explain the concepts of systematic and unsystematic risk, and that unsystematic risk can be diversified away;
- outline the concepts of risk-to-reward ratios, the security market line and the capital asset pricing model; and
- define the term 'cost of capital'.

Learning materials

Textbook

Ross, S.A., Westerfield, R.W. & Jordan, B.D. 2000
Fundamentals of Corporate Finance
5th edn, Irwin McGraw-Hill, Boston, chapters 12 and 13.

Readings

Ross, S. et al. 2001
'The historical record' and 'The variability of returns: The second lesson'
Fundamentals of Corporate Finance
2nd Austn edn, Irwin, Sydney, pp. 305–20.

Key concepts

The following key concepts are introduced and developed in this topic:

- dollar returns;
- percentage returns;
- average returns;
- risk premiums;
- frequency distributions and variability;
- historical variance and standard deviation;
- normal distribution;
- capital market efficiency;
- market indices;
- expected returns;
- portfolios—expected returns and variance;
- risk—systematic and unsystematic;
- diversification and portfolio risk;
- security market line (SML);
- SML and the cost of capital.

Returns

The return on an investment is the financial gain, or reward, for buying and holding an investment. Returns from investments have essentially two parts to them—an income part and a capital gains part. In this section we concentrate on the returns from stocks (shares) which are normally dividends (the income part) and, possibly, an increase in the selling price (the capital gains part).

Reading

Please read the introduction to Chapter 12 and 'Returns', (Section 12.1) in Ross et al. 2000, pp. 352–7. Note the following:

- **the total returns from holding a financial asset are normally income returns (dividends or interest) and possibly capital returns (increases in the price of the financial asset itself) (pp. 353–4 and Equation 12.1);**
- **the total cash back from an investment, if the investment is sold, is equal to the initial investment plus the total return (pp. 354–5 and Equation 12.2);**
- **the idea that 'paper gains' (increases in share prices without you selling the shares) are very much real gains and therefore real returns that could have been taken or realized (p. 355); and**
- **how to calculate percentage returns for dividend yields and capital gains yields (pp. 355–7).**

Note that just as we can have positive returns, we can also have negative returns. Positive returns simply mean that our total returns have made money and negative returns mean that our total return is negative and has lost money.

Exercise 6.1

Attempt 'Questions and problems' 1, 2 and 3 in Ross et al. 2000, pp. 378–9.

The historical record

In this section we are going to concentrate on rates of return in the USA financial markets as they are the biggest financial markets in the world, by far. They are also the most widely researched.

Reading

Please read 'The historical record' (Section 12.2) and 'Average returns: The first lesson' (Section 12.3) in Ross et al. 2000, pp. 357–66. You should note:

- **the survey showing returns from a portfolio of US stocks, US Government long-term bonds (debt) and US Government short-term Treasury Bills (debt) for the years 1925 to 1998;**
- **stocks have over the long term (in this example 73 years) returned far more than interest-bearing government bonds over that same period (p. 358 and Figure 12.4);**
- **small-company stocks (called small-cap stocks) have historically been the biggest returning financial investments (p. 358 and Figure 12.4);**
- **long-term government bonds have returned more over the longer term (the 73 years) than short-term government bonds (pp. 358–9 and Figure 12.4);**
- **the nominal annual average return for the portfolio of the large-company shares was 13.2% (p. 362);**
- **the nominal annual average return for the portfolio of the small-company shares was 17.4% (p. 363);**
- **the annual average inflation rate was 3.2% (p. 363);**
- **the nominal annual average return on US Government short-term debt was 3.8% (p. 363);**
- **the nominal annual average return for the portfolio of long-term US Government bonds was 5.7% (p. 365);**
- **the nominal annual average return for the portfolio of long-term corporate bonds was 6.1% (p. 365);**
- **the idea that the return from US Treasury Bills (with a three-month maturity) is referred to as a risk free return (p. 365);**
- **the difference between the returns from stocks and the returns from the Treasury Bills is called the 'excess return' and/or 'risk premium' (p. 365); and**
- **the risk premiums for each of the five investment groups (p. 365, Table 12.3).**

Exercise 6.2

Attempt 'Questions and problems' 5 and 6 (p. 379) and 'Chapter review and self-test problems' 12.1 (p. 377) in Ross et al. 2000.

Risk and the variability of returns

You can see from Table 12.1 (Ross et al. 2000, pp. 363–4) and Figures 12.5, 12.6, 12.7 and 12.8 (pp. 360–2) that the large-company and small-company stocks were much more volatile than long-term government bonds and short-term treasury bills. Volatility is commonly assessed using two measures—a 'variance' and a 'standard deviation'. In this section you will learn how to calculate them.

Reading

Please read 'The variability of returns: The second lesson' (Section 12.4) in Ross et al. 2000, pp. 366–71. You should note particularly:

- **the frequency of the annual returns for the large-company stocks (pp. 366–7 and Figure 12.9);**
- **the calculation of the average return, the variance and the standard deviation (or square root of the variance) (pp. 367–8);**
- **the historical returns, standard deviations and frequency distributions of shares, bonds and bills in the Ibbotson Associates study over 73 years (p. 369 and Figure 12.10);**
- **the bell-shaped curve of the normal distribution (p. 370 and Figure 12.11);**
- **the probability of returns in a normal distribution being within one standard deviation is around 68%, within two standard deviations being around 95% and within three standard deviations being around 99% (p. 370); and**
- **seeking higher returns through shares and long-term bonds has higher risks than short-term government debt (p. 371).**

Exercise 6.3

Attempt 'Chapter review and self-test problem' 12.2 (p. 377) and 'Questions and problems' 7, 8, 9 and 10 (pp. 379–80) in Ross et al. 2000.

Capital market efficiency

Some of you will not like the idea of receiving 'average returns'; it is our nature to want to be better than average. It is also in our nature to feel very uneasy about the volatility of shares and bonds and to totally dislike the possibility of ever having negative returns. In this next section, we look at the efficiency of capital markets and whether the markets can be beaten.

Reading

Read 'Capital market efficiency' (Section 12.5) in Ross et al. 2000, pp. 372–6. You should note:

- **the definition of an efficient capital market being one which fully values (prices) the shares and bonds on all available information (p. 372);**
- **the differences between delayed reactions to information, overreactions and efficient market reactions (pp. 372–3);**
- **all investments in an efficient market are priced so as to have a zero NPV (p. 373);**
- **well-organised capital markets like stock exchanges are efficient markets (pp. 373–5); and**
- **the different forms of market efficiency being weak, semi-strong and strong (pp. 375–6).**

Exercise 6.4

Attempt 'Concepts review and critical thinking questions' 4, 7, 8 and 9 in Ross et al. 2000, p. 379.

Ross et al. (2001) have tried to duplicate the U.S. studies dealing with rates of return using Australian financial market data. It is not necessary that you read this in preparation for the exam. You may, however, choose to look at it out of interest.

Reading

Read Ross et al. 2001, 'The Historical Record', and Ross et al. 2001, 'The Variability of returns: The second lesson'.

Stockmarkets around the world

As discussed in Topic 1, two of the major reasons that stockmarkets exist is to allow companies to raise money from the public and then to allow those investors to sell their initial holdings to other investors. In the previous sections we concentrated on the returns from US securities and suggested that the stock market there was by far the largest in the world. The following table shows a ranking of the world's stockmarkets by market capitalisation as at December 1997. (Market capitalisation means the market price of the shares multiplied by the number of issued shares.)

Country/Continent	Percentage of World
United States	49.8%
Japan	12.9%
United Kingdom	10.7%
Australia	1.5%
Malaysia, Singapore & Hong Kong	3.1%
Other Europe	17.4%
Other	4.6%

Source: IPAC Securities and FT Actuaries World Index.

There are actually many stockmarkets in the USA. The biggest is the New York Stock Exchange (NYSE) followed by the American Stock Exchange (AMEX) and then the Nasdaq Stock Market (NASDAQ). There are also much smaller exchanges in Chicago, Boston, Philadelphia and Cincinatti.

Japan has eight independent stock markets but the Tokyo Exchange is the biggest.

The United Kingdom has six outlets located in different geographical locations but there is only one exchange.

Malaysia has only one exchange, the Kuala Lumpur Stock Exchange (KLSE). Singapore has the Stock Exchange of Singapore (SES). Hong Kong has the Stock Exchange of Hong Kong.

We in Australia have only one really major exchange—the Australian Stock Exchange (ASX).

Each of these stockmarkets uses various indices to summarise price movements in the underlying stocks of those stockmarkets. The most common indices for the markets include the following:

- Dow Jones Industrial Average—which shows the price movements of the top 30 manufacturing businesses listed on the New York Stock Exchange. The companies included are General Motors, IBM and Coca-Cola.
- NYSE Composite Index—shows the movements in the value of all common (ordinary) stocks listed on the NYSE. Each company has a weighted market value and contributes to the index on the basis of this weighting. The weighting changes daily.
- Standard and Poor's 500 (S&P 500)—based on 400 industrial, 40 financial, 40 utilities and 20 transport companies in the USA. It is similar in concept to the NYSE Composite Index in terms of weighted market values.
- NASDAQ Composite Index—involves around 5000 listed companies and is similar in concept to the NYSE Composite in terms of weighted market values.
- FT-SE 100 Index—commonly called the 'Footsie'. This provides an index on the top 100 (by market capitalisation) companies listed in the UK.
- Nikkei Dow Jones Average—uses the share prices of 250 companies listed on the Tokyo Exchange with all companies (small and large) given equal weighting.
- Malaysia has the KLSE Composite, Singapore has the Straits Times Industrial and Hong Kong has the Hang Seng.

The Australian Stock Exchange came about by the merger of the various capital city stock exchanges in Australia on 31 December 1979. From that date the two major indices, namely the All Ordinaries Index and the All Ordinaries Accumulation Index began with a base of 500. The All Ordinaries Index is now made up of around 500 of Australia's top companies. The index only measures changes in the total market value of those companies used in the index. Each company's proportion of the index is weighted by multiplying the number of shares by the price per share meaning that the market capitalisation weighting system places more emphasis on the larger companies than the smaller ones. The All Ordinaries Accumulation Index is similar to the All Ordinaries Index except that it assumes that all dividends paid by the representative companies are reinvested in the shares of those companies.

In more recent times, the ASX has introduced other indices including the ASX 300, ASX 200 and ASX 100 Indices covering the top 300, 200 and 100 companies by market capitalisation. It also has the ASX 20 and the ASX 50 Leaders Index covering the top 20 and 50 companies by market capitalisation.

There are another two indices worth noting here. The Morgan Stanley Capital International World Index (MSCI World Index) shows average changes in share prices for various stockmarkets around the world. Around 1500 companies in 20 different countries accounting for about 60% of the value of the world's shares are included. The other is the MSCI World Accumulation Index which is the MSCI World Index with all dividends from those representative companies being reinvested in the shares of the dividend-paying entities.

Expected returns and variances for individual securities

Earlier in this topic we discussed the historical returns from holding various classes of financial assets. In the following sections we will discuss expected future returns and the probabilities of those expected returns. We will focus on the expected future returns from stocks.

Reading

Please read the introduction to Chapter 13 and 'Expected returns and variances' (Section 13.1) in Ross et al. 2000, pp. 381–5. You should note:

- **how to calculate an expected return, which is simply the sum of the expected returns multiplied by the probability of those expected returns (pp. 382–3);**
- **the concept of a risk premium being the expected return minus the risk free rate (p. 383); and**
- **how to calculate the variance and the standard deviation for expected future returns (pp. 384–5).**

At this point we should summarise how we calculate expected returns, variances and standard deviations with an example. In this example we will show you an easy six-step process on how to calculate these measures. We will also show you that instead of using percentage returns you can also use dollar-value returns to calculate expected returns, variances and standard deviations.

Assume that you are investigating an investment that you forecast has five possible expected returns ($R(i)$) for the next year—\$6000, \$8000, \$10 000, \$12 000 and \$14 000. Assume also that you forecast the probability of occurrence (($P(i)$) for each of these expected returns is 10%, 25%, 30%, 25% and 10% respectively.

Step 1
Calculate the expected return $E(R)$

The expected return $E(R)$ is equal to the sum of each expected return $R(i)$ multiplied by each probability of occurrence $P(i)$ or;

$$\begin{aligned} E(R) &= \$6000 \times .1 + \$8000 \times .25 + \$10\,000 \times .3 + \$12\,000 \times .25 + \\ &\quad \$14\,000 \times .1 \\ &= \$600 + \$2000 + \$3000 + \$3000 + \$1400 \\ &= \$10\,000 \end{aligned}$$

So far so good. Now we need to consider the risk or possible variability around that expected return. The two measures of risk that you learned were the variance and the standard deviation.

Step 2
Calculate the differences between each possible return and the expected return

\$6000 – \$10 000 = – \$4000
\$8000 – \$10 000 = – \$2000
\$10 000 – \$10 000 = \$0
\$12 000 – \$10 000 = \$2000
\$14 000 – \$10 000 = \$4000

Step 3
Square the differences

$(-\$4000)^2 = \$16\,000\,000$
$(-\$2000)^2 = \$4\,000\,000$
$(\$0)^2 = \$0$
$(\$2000)^2 = \$4\,000\,000$
$(\$4000)^2 = \$16\,000\,000$

Step 4
Multiply these squared differences by the probability of occurrence

\$16 000 000 × .10 = \$1 600 000
\$4 000 000 × .25 = \$1 000 000
\$0 × .3 = \$0
\$4 000 000 × .25 = \$1 000 000
\$16 000 000 × .10 = \$1 600 000

Step 5
Calculate the variance by summing the above results

\$1 600 000 + \$1 000 000 + \$ 0 + \$1 000 000 + \$1 600 000 = \$5 200 000

Step 6
Calculate the standard deviation by taking the square root of the variance

$$\sqrt{\$5\,200\,000} = \$2280.00$$

Now remember back to the previous section titled 'Risk and the variability of returns'. With normal distributions (or bell-shaped curves, like this example) there is:

- a 68% probability that the actual return will be within one standard deviation from the expected return;
- a 95% probability that it will be within two standard deviations; and
- a 99% probability that it will be within three standard deviations.

In our example we have an expected return which is \$10 000 and a standard deviation of \$2280. Knowing these measures the investor should feel very comfortable that the return is going to be positive. The investor should also feel fairly comfortable (68% chance) that the project will be \$10 000 plus or minus \$2280. Even at a 'worst downside', three standard deviations away (\$10 000 – 3 × \$2280), we expect a positive return of \$3160.

One other point needs to be made here. These results and these calculations are based on forecasts. We have forecasted expected future returns and we have forecasted the probabilities of those returns happening. If these forecasts are wrong then, regrettably, you know what can happen.

Exercise 6.5

Attempt 'Chapter review and self-test problem' 13.1 (pp. 408–9) and 'Questions and problems' 5, 6 and 7 (pp. 412–3) in Ross et al. 2000.

Portfolios

So far we have only considered single investments in financial assets but most investors hold investments in more than one asset. This holding of more than one asset (financial or real assets) is called a portfolio. As most investors hold a portfolio of assets, we need to consider the expected returns and risk of portfolios.

Reading

Please read 'Portfolios' (Section 13.2) in Ross et al. 2000, pp. 385–8. You should note:

- **the definition of a portfolio (p. 385);**
- **the calculation of portfolio weights due to the percentage holding of individual assets in that portfolio (p. 386);**
- **the calculation of expected returns (pp. 386–7);**
- **the calculation of the portfolio variance (pp. 387–8); and**
- **the combination of individual assets into a portfolio can actually allow a reduction in the risk (standard deviation) of the individual assets (p. 388).**

Exercise 6.6

Attempt 'Chapter review and self-test problem' 13.2 (p. 409), 'Questions and problems' 8, 9, 10, 21 and 23 (pp. 413–5) in Ross et al. 2000.

Announcements, surprises and expected returns

You should continue to note that the expected returns discussed above are our 'best estimate' forecasts and not actual returns. Invariably there are differences between expected, or forecasted returns and actual returns. What then causes the differences between the expected returns and the actual returns?

Reading

Please read 'Announcements, surprises and expected returns' (Section 13.3) in Ross et al. 2000, pp. 389–93. You should note:

- **the total return from an investment is made up of an expected return and an unexpected return (p. 390);**

- **announcements can be expected and unexpected (or surprise) and both can have an impact on the total return from an investment (pp. 390–2); and**
- **Ross et al. 2000, will, from now on, use the expression 'news' to refer to unexpected announcements or surprises (p. 392).**

Exercise 6.7

Attempt 'Concepts review and critical thinking questions' 2, 9 and 10 (pp. 411–2) in Ross et al. 2000.

Risk: Systematic and unsystematic

In the previous section, we discussed that the return from an investment is basically the expected return plus an unexpected return. The unexpected return is that part of the return that contains surprises or risks.

There are two basic types of surprises or risks. The first type of risk is what is known as systematic risk, i.e. is risk that is inherent by investing in the market. This is a risk that influences a substantial number of assets (or investments) in the market. An example of systematic risk (also called market risk) is the Reserve Bank suddenly announcing an official drop in interest rates. This type of surprise announcement is likely to affect a substantial number of assets in the market. Another example of systematic risk is the Federal Government announcing better than expected inflation figures for the last quarter.

The second type of risk is called unsystematic risk. Unsystematic risk is the risk that is peculiar, or specific, to single investments or a small group of investments. Examples of unsystematic risk are an unexpected labour strike or a disgruntled employee planting poison (or suggesting to have planted poison) in the company's products which are readily available on supermarket shelves.

Reading

Please read 'Risk: Systematic and unsystematic' (Section 13.4) in Ross et al. 2000, pp. 392–3. You should note:

- **the definition of systematic risk (p. 392);**
- **the definition of unsystematic risk (p. 392); and**
- **the unexpected return portion (U) of the Equation 13.3 on p. 390 can be broken down to contain a systematic risk portion and an unsystematic risk potion (p. 393).**

Diversification and portfolio risk

In the previous section entitled 'Portfolios' we discussed that combining assets can substantially alter the risks of the investor. In this section you will learn more about the risk of individual investments versus the risk of a portfolio.

Reading

Please read 'Diversification and portfolio risk' (Section 13.5) in Ross et al. 2000, pp. 393–7. You should note:

- **Column 1 of Table 13.7 showing the number of randomly selected stocks in a portfolio and Column 2 showing the average standard deviation (risk) of return of holding the number of stocks in Column 1 (p. 394);**
- **there is a substantial reduction in standard deviation by holding a portfolio of even two securities rather than just one (p. 394);**
- **the average standard deviation of return falls as more securities are included in the portfolio (p. 394);**
- **the principle of diversification suggests that investing in a number of assets can reduce some risk; risk which can be reduced is called 'diversifiable risk' (pp. 394–5);**
- **diversifiable risk is (also called unsystematic risk) can essentially be eliminated by holding a portfolio of around 20 or more equally weighted (in terms of money invested) shares (pp. 395–6); and**
- **systematic risk cannot be diversified away because, by definition, it is the risk that is in the 'system' or the market, and affects a very substantial number of assets in the market (p. 396).**

An Australian study by R. Officer (Ball et al. 1989) examined annual rates of return and standard deviations from Australian shares over the period 1882 to 1987. In this study, Officer showed that Australian shares over this period had an average rate of return of 13.06% and a standard deviation of 17.01%. Compare this to the standard deviation of around 19% in the Elton and Gruber study of New York Stock Exchange stocks in Table 13.7 (Ross et al. 2000, p. 394) and the standard deviation of around 20% in the Ibbotson study of large company stocks in Figure 12.10 (Ross et al. 2000, p. 369).

You can see that for the periods studied that the non-diversifiable risk, or systematic risk, for the portfolio of Australian shares was around 17% and for the portfolio of large company shares in the USA around 19–20%.

Exercise 6.8

Attempt 'Concepts review and critical thinking questions' 1, 3, 4 and 6 (p. 411) in Ross et al. 2000.

Systematic risk and beta

It is now time to concern ourselves with the question of how much risk there is in a single risky asset. Continue to think of the assets under consideration being shares. Imagine a friend suggested that you invest in IBM or Wal-Mart or perhaps in National Australia Bank or in Coles-Myer shares. Is one investment more risky than the other? How much more risky are these investments than the average asset? Let's consider firstly the shares IBM and Wal-Mart, which are shares listed in the USA.

Reading

Please read 'Systematic risk and beta' (Section 13.6) in Ross et al. 2000, pp. 397–9. You should note:

- **the 'systematic risk principle' suggests that because unsystematic risk can be diversified away, the market will only reward the investor for the systematic risk of the investment (asset) being considered (pp. 397–8);**
- **the expression beta (or beta coefficient (β)) reflects the amount of systematic risk a particular investment has relative to an average asset (p. 398);**
- **an asset with a beta of 1 has a systematic risk equal to the average asset; an asset with a beta of 2 has a systematic risk which is twice the risk of the average asset, and an asset with a beta of 0.5 has a systematic risk which is half the risk of the average asset (p. 398);**
- **Wal-Mart has a beta of 1.15 in Table 13.8 suggesting that it has 1.15 times the risk of the average asset. IBM has a beta of 0.95 suggesting that it has 0.95 times the risk of the average asset (p. 397);**
- **different reporting and stock-broking agencies may have calculated the betas for the same organisation differently and therefore they may have different betas (p. 398); and**
- **portfolio betas are the weighted average of the betas of the individual assets in the portfolio multiplied by the proportion invested in each asset (pp. 398–9 and Example 13.6).**

Table 6.1 reflects the betas calculated by Deutsche Morgan Grenfell Securities in September 1997 for various Australian shares.

Table 6.1: Beta coefficients for selected shares (September 1997)

Share	Beta
Amcor	1.11
BHP	0.99
Boral	1.10
Coca-Cola Amatil	1.04
Coles Myer	0.65
Mayne Nickless	0.80
National Australia Bank	1.09
Rothmans	0.52
Westpac	1.37

Source: Gitman et al. 1998, p. 222.

You can see from the above that Coles Myer had a beta of 0.65 suggesting that it was 0.65 times the risk of an average Australian share. Note that National Australia Bank (NAB) had a beta of 1.09 suggesting that this financial asset was 1.09 times the risk of the average Australian financial asset. Note also that because of this higher risk you would expect a higher risk premium for investing in NAB than you would for investing in Coles Myer.

You may even like to think of the company's beta as its 'aggression' factor. A company with a beta of more than 1 is essentially more aggressive than the market (meaning more risky) while a company with a beta of less than 1 is essentially less aggressive than the market (meaning less risky).

There are many reporting agencies as well as many stockbrokers that publish (and sell) beta figures for Australian financial assets. These reporting agencies include the Australian Graduate School of Management in Sydney.

Exercise 6.9

Attempt 'Questions and problems' 11 and 12 (p. 413) in Ross et al. 2000.

The security market line (SML)

We are now in a position to try to calculate how those who invest in risky assets are rewarded for the risk they take. You should remember that the 'efficient market' hypothesis underpins the concept of the security market line which we are about to discuss.

Reading

Please read 'The security market line' (Section 13.7) in Ross et al. 2000, pp. 399–406. You should note:

- **how to calculate the expected return on a portfolio and the beta of the portfolio when a risky and a riskless asset are included in the portfolio (pp. 400–1);**
- **how to calculate the 'reward-to-risk ratio' (pp. 400–2);**
- **the reward-to-risk ratio will (in an efficient market) be the same for all assets in the market (pp. 403–4);**
- **the security market line represents (on average) the relationship between the systematic risk (beta) and the expected return for all assets or securities in the market portfolio (p. 404);**
- **the concept of a market risk premium (or the premium for investing in the market) (p. 404); and**
- **the concept of the capital asset pricing model which suggests that the expected return on an individual security within the market should equal the risk-free rate of return plus the market risk premium multiplied by the systematic risk of the security under consideration (pp. 405–6 and Equation 13.7).**

Exercise 6.10

Attempt 'Chapter review and self-test problems' 13.3 and 13.4 (p. 409) and 'Questions and problems' 13, 14, 15, 16 and 17 (pp. 413–4) in Ross et al. 2000.

The SML and the cost of capital

The security market line (SML) as you observed is the line that shows investors their expected return on an investment for investing in the financial market. The company's obligation then is to find investments that offer better that this rate of return so as to provide shareholders with wealth-making opportunities (or positive NPV investments). In this section we search for an answer to the question: 'What then is the appropriate discount rate on investment projects that the company might undertake given that investors can invest in the financial markets'?

Reading

Please read 'The SML and the cost of capital: A preview' (Section 13.8) in Ross et al. 2000, p. 407. You should note:

- **the expected return on a new investment should be at least what the financial market offers on an investment with the same beta (p. 407); and**
- **the minimum expected rate of return is synonymous with the cost of capital (p. 407).**

Summary

In this topic we discussed that there is a real correlation between the expected rate of return on an investment and the risk of investing in that asset. We also mentioned that any investments which are not riskless need to incur a risk premium. This risk premium, however, should include only systematic risk, not unsystematic risk which can be eliminated through diversification.

The concept of the efficient market was discussed and it was suggested that stock exchanges were generally efficient and reacted correctly in the pricing of the financial assets that are listed on those exchanges.

You also encountered the security market line, which represents expected returns from financial assets given the systematic risk of those financial assets. This line can then be used as a benchmark for comparing expected returns from an investment to determine if that investment is going to be wealth making (having a positive NPV) for the investor.

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Gitman, L.J., Juchau, R., Flanagan, J., Pearson, K. & Clemens, M. 1998, *Principles of Managerial Finance,* 2nd edn, Longman, Melbourne.

Ross, S.A., Thompson, S.C., Christensen, M.J., Westerfield, R.W. & Jordan, B.D. 2001, *Fundamentals of Corporate Finance,* 2nd Australian edn, Irwin McGraw-Hill, Sydney.

Further resources

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Peirson, C.G., Brown, R.L., Easton, S. & Howard, P. 1998, *Business Finance,* 7th edn, McGraw-Hill, Sydney.

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Suggested answers

Topic
6

Exercises

Exercise 6.1

1. $R = [\$1.25 + (\$45 - \$58)] / \$58 = -20.26\%$

2. Dividend yield = $\$1.25 / \$58 = 2.16\%$;
   Capital gains yield = $(\$45 - \$58) / \$58 = -22.41\%$

3. $R = [\$1.25 + (\$75 - \$58)] / \$58 = 31.47\%$

   Dividend yield = $\$1.25 / \$58 = 2.16\%$;
   Capital gains yield = $(\$75 - \$58) / \$58 = 29.31\%$

Exercise 6.2

5. $R = 1.132 / 1.032 - 1 = 9.69\%$

6. $R_G = 1.057 / 1.032 - 1 = 2.42\%$; $R_C = 1.061 / 1.032 - 1 = 2.81\%$

Exercise 6.3

7. $$\bar{X} = \left[\sum_{i=1}^{N} x_i\right] / N = \frac{[.18 + .11 - .09 + .13 + .07]}{5} = 8.00\%;$$

$$\bar{Y} = \left[\sum_{i=1}^{N} y_i\right] / N = \frac{[.28 - .07 - .20 + .33 + .16]}{5} = 10.00\%$$

$$s_x^{\,2}\left[\sum_{i=1}^{N} (x_i - \bar{x})^2\right] / (N-1)$$

$$= \frac{1}{5-1}[(.18 - .08)^2 + (.11 - .08)^2 + (-.09 - .08)^2 + (.13 - .08)^2 + (.07 - .08)^2] = .01060$$

$$s_Y^{\,2} = \frac{1}{5-1}[(.28 - .10)^2 + (-.07 - .10)^2 + (-.20 - .10)^2 + (.33 - .10)^2 + (.16 - .10)^2] = .05195$$

$$s_x = \sqrt{.01060} = 0.10296 = 10.30\%; \quad s_Y = \sqrt{.05195} = 0.2279 = 22.79\%$$

8.

Year	Small co. stock return	T-bill return	Risk premium
1970	4.0%	6.7%	– 2.7%
1971	14.35	4.50	9.85
1972	18.99	4.06	14.93
1973	– 14.85	6.98	– 21.83
1974	– 26.58	8.09	– 34.67
1975	37.42	6.03	31.39
	33.33	36.36	– 3.03

(a). Large company stocks: average return = 33.33 / 6 = 5.56%
T-bills: average return = 36.36 / 6 = 6.06%

(b) Large company stocks:
variance = $1/5[(.0400 - .0556)^2 + (.1435 - .0556)^2 + (.1899 - .0556)^2 + (-.1485 - .0556)^2 + (-.2658 - .0556)^2 + (.3742 - .0556)^2] = .0544934$
standard deviation = $(.0544934)^{1/2} = 0.2334 = 23.34\%$

T-bills:
variance = $1/5[(.067 - .0606)^2 + (.0450 - .0606)^2 + (.0406 - .0606)^2 + (.0698 - .0606)^2 + (.0809 - .0606)^2 + (.0603 - .0606)^2] = .000236228$
standard deviation = $(.000236228)^{1/2} = 0.0154 = 1.54\%$

(c) Average observed risk premium = $-3.03/6 = -.505\%$
variance = $1/5[(-.0270 - .0505)^2 + (.0985 - .0505)^2 + (.1493 - .0505)^2 + (-.2183 - .0505)^2 + (-.3467 - .0505)^2 + (.3139 - .0505)^2] = 0.059792$
standard deviation = $(0.059792)^{1/2} = 0.2445 = 24.45\%$

(d) Before the fact, for most assets the risk premium will be positive; investors demand compensation over and above the risk-free return to invest their money in the risky asset. After the fact, the observed risk premium can be negative if the asset's nominal return is unexpectedly low, the risk-free return is unexpectedly high, or if some combination of these two events occurs.

9. (a) Average return = $\{.06 - .10 + .04 + .23 + .17\} / 5 = .08 = 8\%$

(b) Variance = $1/4[(.06 - .08)^2 + (-.10 - .08)^2 + (.04 - .08)^2 + (.23 - .08)^2 + (.17 - .08)^2] = 0.01625$
Standard deviation = $(0.01625)^{1/2} = 0.12748 = 12.75\%$

10. (a) $\bar{r} = (1.08 / 1.035) - 1 = 4.35\%$

(b) $\overline{RP} = \overline{R} - \overline{R}_f = .08 - .038 = 4.20\%$

Exercise 6.4

4. On average, the only return that is earned is the required return—investors buy assets with returns in excess of the required return (positive NPV), bidding up the price and thus causing the return to fall to the required return (zero NPV); investors sell assets with returns less than the required return (negative NPV), driving the price lower and thus causing the return to rise to the required return (zero NPV).

7. Ignoring trading costs, on average, such investors merely earn what the market offers; the trades all have zero NPV. If trading costs exist, then these investors lose by the amount of the costs.

8. Unlike gambling, the stock market is a positive sum game; everybody can win. Also, speculators provide liquidity to markets and thus help promote to efficiency.

9. The EMH only says, within the bounds of increasingly strong assumptions about the information processing of investors, that assets are fairly priced. An implication of this is that, on average, the typical market participant cannot earn excessive profits from a particular trading strategy. However, that does not mean that a few particular investors cannot outperform the market over a particular investment horizon. Certain investors who do well for a period of time get a lot of attention from the financial press, but the scores of investors who do not do well over the same period of time generally get considerably less attention from the financial press.

Exercise 6.5

5. $E[R] = .4(.05) + .6(.28) = 18.8\%$

6. $E\,[R] = .3(-.05) + .6(.12) + .1(.20) = 7.7\%$

7. $E\,[R_A] = .25(.06) + .45(.07) + .30(.11) = 7.95\%$

   $E\,[R_B] = .25(-.2) + .45(.13) + .30(.33) = 10.75\%$

   $\sigma^2{}_A = .25(.06 - .0795)^2 + .45(.07 - .0795)^2 + .30(.11 - .0795)^2 =$ $.000415$;

   $\sigma_A = [.000415]^{1/2} = .020365$

   $\sigma^2{}_B = .25(-.2 - .1075)^2 + .45(.13 - .1075)^2 + .30(.33 - .1075)^2 =$ $.038719$;

   $\sigma_B = [.038719]^{1/2} = .196771$

Exercise 6.6

8. $E[R_p] = .25(.05) + .55(.25) + .2(.35) = 22\%$

9. (a) boom: $E[R_p] = (.14 + .15 + .33) / 3 = .2067$;
   bust: $E[R_p] = (.12 + .03 - .06) / 3 = .03$
   $E[R_p] = .35(.2067) + .65(.03) = .0918$

   (b) boom: $E[R_p] = .15(.14) + .15(.15) + .7(.33) = .2745$;
   bust: $E[R_p] = .15(.12) + .15(.03) + .7(-.06)$
   $E[R_p] = .0195$
   $E[R_p] = .35(.2745) + .65(-.0195) = .0834$
   $\sigma^2{}_p = .35\,(.2745 - .0834)^2 + .65(-.0195 - .0834)^2 = .01966$;
   $\sigma_p = [.01966]^{1/2} = .1402$

10. (a) boom: $E[R_p] = .35(.3) + .30(.45) = .35(.33) = .3555$
   good: $E\,[R_p] = .35(.12) + .30(.10) + .35(.15) = .1245$
   poor: $E\,[R_p] = .35(.01) + .30(-.15) + .35(-.05) = -.0590$
   bust: $E\,[R_p] = .35(-.20) + .30(-.30) + .35(-.09) = -.1915$
   $E\,[R_p] = .20(.3555) + .20(.1245) + .50(-.059) + .10(-.1915)$
   $= .04735$

   (b) $\sigma^2{}_p = .20\,(.3555 - .0474)^2 + .20(.1245 - .0474)^2 +$
   $.50(-.059 - .0474)^2 + .10(-.1915 - .0474)^2$
   $\sigma^2{}_p = .03154$; $\sigma_p = [.03154]^{1/2} = .1776$

21. For a portfolio that is equally invested in large-company stocks and long-term bonds:
    return = (13.2% + 5.7%) / 2 = 9.45%

    For a portfolio that is equally invested in small stocks and treasury bills:
    return = (17.4% + 3.8%) / 2 = 10.60%

23. (a) boom: $E[R_p] = .4(.40) + .4(.35) + .2(.6) = .42$
    normal: $E\,[R_p] = .4(.15) + .4(.15) + .2(.05) = .13$
    bust: $E\,[R_p] = .4(0) + .4(-.25) + .2\,(-.75) = -.25$
    $E\,[R_p] = .30(.42) + .50(.13) + .2(-.25) = -.1410$
    $\sigma^2{}_p = .30(.42 - .1410)^2 + .50(.13 - .1410)^2 + .2(-.25 - .1410)^2 = .05399$
    $\sigma_p = [.05399]^{1/2} = .2324$

    (b) $RP_i = E[R_i] - R_f = .1410 - .038 = .103$

    (c) Approximate expected real return = .1410 – .035 = .106
    $(1 + E[R_i]) = (1 + h)(1 + E[R_i])$;
    Exact expected real return = $E[R_i] = [1.1410 / 1.035] - 1 = .1024$
    Approximate expected real risk premium = .1410 – .038 = .1030
    Exact expected real risk premium = .1030 / 1.035 = .0995

Exercise 6.7

2. If the market expected the growth rate in the coming year to be 2 per cent, then there would be no change in security prices if this expectation had been fully anticipated and priced. However, if the market had been expecting a growth rate different than 2 per cent and the expectation was incorporated into security prices, then the government's announcement would most likely cause security prices in general to change; prices would drop if the anticipated growth rate had been more than 2 per cent, and prices would rise of the anticipated growth rate had been less than 2 per cent.

9. Such layoffs generally occur in the context of corporate restructurings. To the extent that the market views a restructuring as value-creating, stock prices will rise. So, it's not layoffs per se that are being cheered on. Nonetheless, Wall Street does encourage corporations to take actions to create value, even if such actions involve layoffs.

10. Earnings contain information about recent sales and costs. This information is useful for projecting future growth rates and cash flows. Thus, unexpectedly low earnings often lead market participants to reduce estimates of future growth rates and cash flows; price drops are the result. The reverse is often true for unexpectedly high earnings.

Exercise 6.8

1. Some of the risk in holding any asset is unique to the asset in question. By investing in a variety of assets, this unique portion of the total risk can be eliminated at little cost. On the other hand, there are some risks that affect all investments. This portion of the total risk of an asset cannot be costlessly eliminated. In other words, systematic risk can be controlled, but only by a costly reduction in expected returns.

3. (a) systematic

    (b) unsystematic

    (c) both; probably mostly systematic

    (d) unsystematic

(e) unsystematic

(f) systematic

4. (a) systematic risk; market prices in general will most likely decline.

   (b) unsystematic risk; company price will most likely stay constant.

   (c) systematic risk; market prices in general will most likely stay constant.

   (d) unsystematic risk; company price will most likely decline.

   (e) systematic risk; market prices in general will most likely stay constant.

6. False. The variance of the individual assets is a measure of the total risk. The variance on a well-diversified portfolio is a function of systematic risk only.

Exercise 6.9

11. $\beta_p = .3(1.4) + .2(.6) + .1(1.5) + .4(1.8) = 1.41$

12. $\beta_p = 1.0 = \frac{1}{3}(0) + \frac{1}{3}(1.9) + \frac{1}{3}(\beta_x);\ \beta_x = 1.1$

Exercise 6.10

13. $E[R_i] = .04 + (.18 - .04)(1.2) = .208$

14. $E[R_i] = .14 = .05 + .08\beta_i;\ \beta_i = 1.125$

15. $E[R_i] = .18 = .05 + (E[R_{mkt}] - .05)(.9);\ E[R_{mkt}] = .1944$

16. $E[R_i] = .23 = R_f + (.16 - R_f)(1.6);\ R_f = .0433$

17. (a) $E[R_p] = (.13 + .04)/2 = .085$

    (b) $\beta_p = 0.6 = x_s(0.8) + (1 - x_s)(0);\ x_s = 0.6/0.8 = .750;$
    $x_{Rf} = 1 - .750 = .250$

    (c) $E[R_p] = .11 = .13x_s + .04(1 - x_s);x_s = .7778;$
    $\beta_p = .7778(0.8) + \frac{1}{3}(0) = 0.62$

    (d) $\beta_p = 1.6 = x_s(0.8) + (1 - x_s)(0);\ x_s = 1.6/0.8 = 2;$
    $x_{Rf} = 1 - 2 = -1$

    The portfolio is invested 200% in the stock and –100% in the risk-free asset. This represents borrowing at the risk-free rate to buy more of the stock.

18. $\beta_p = x_w(1.6) + (1 - x_w)(0) = 1.6x_w$
    $E[R_w] = .25 = .05 + \text{MRP}(1.60);$
    $\text{MRP} = .20/1.6 = .1250$
    $E[R_p] = .05 + .1250\beta_p;$ slope of line = MRP = .1250;
    $E[R_p] = .05 + .1250\beta_p = .05 + .20x_w$

x_w	$E[R_p]$	β_p	X_w	$E[R_p]$	β_p
0%	.05	0	100%	.25	1.6
25	.10	0.4	125	.30	2
50	.15	0.8	150	.35	2.4
75	.20	1.2			

The historical record

S. Ross et al.

Source: Ross, S., Thompson, S., Christensen, M., Westerfield, R. & Jordan, B. 2001, *Fundamentals of Corporate Finance,* 2nd Austn edn, Irwin, Sydney, pp. 305–20.

Roger Ibbotson and Rex Sinquefield conducted a famous set of studies dealing with rates of return in US financial markets.1 We have duplicated their study using Australian financial market data. We present quarter-to-quarter historical rates of return on four important types of financial investment. The returns can be interpreted as what you would have earned if you held portfolios of the following:

1. Ordinary shares. The ordinary share portfolio is based on 250 of the largest companies (in terms of total market value of outstanding equity) in Australia.

2. Small shares. This is a portfolio composed of the smallest of the companies listed on the Australian Stock Exchange (ASX), again as measured by market value of outstanding equity.

3. Ten-year government bonds. This is a portfolio of government bonds with a 10-year maturity.

4. Bank bills. This a portfolio of bank bills with a 90-day maturity.

These returns are not adjusted for inflation or taxes; thus, they are nominal, pretax returns.

In addition to the quarter-to-quarter returns on these financial instruments, the quarter-to-quarter percentage change in the Consumer Price Index (CPI) is also computed. This is a commonly used measure of inflation, so we can calculate real returns using this as the inflation rate.

In their own words ...

Roger Ibbotson on capital market history*

The financial markets are perhaps the most carefully documented human phenomena in history. Every day, approximately 2,000 NYSE stocks are traded, and at least 5,000 more are traded on other exchanges and in over-the-counter markets. Bonds, commodities, futures, and options also provide a wealth of data. These data daily fill a dozen pages of *The Wall Street Journal* (and numerous other newspapers), and these pages are only summaries of the day's transactions. A record actually exists of every transaction, providing not only a real-time database, but a historical record extending back, in many cases, more than a century. The global market adds another dimension to this wealth of data. The Japanese stock market trades a billion shares on active days, and the London exchange reports trades on over 10,000 domestic and foreign issues a day. The data generated by these transactions are quantifiable, quickly analysed and disseminated, and made easily accessible by computer. Because of this, finance has increasingly come to resemble one of the exact sciences. The use of financial market data ranges from the simple, such as using the S&P 500 to measure the performance of a portfolio, to the incredibly complex. For example, only a generation ago, the bond market was the staidest province on Wall Street. Today, it attracts swarms of traders seeking to exploit arbitrage opportunities (small temporary mispricings) using real-time data and supercomputers to analyse them.

Financial market data are the foundation for the extensive empirical understanding we now have of the financial markets. The following is a list of some of the principal findings of such research: Risky securities, such as stocks, have higher average returns than riskless securities such as Treasury bills. Stocks of small companies have higher average returns than those of larger companies. Long-term bonds have higher average yields and returns than short-term bonds. The cost of capital for a company, project, or division can be predicted using data from the markets. Because phenomena in the financial markets are so well measured, finance is the most readily quantifiable branch of economics. Researchers are able to do more extensive empirical research than in any other economic field, and the research can be quickly translated into action in the marketplace.

* Roger Ibbotson is Professor in the Practice of Management at the Yale School of Management. He is the founder and president of Ibbotson Associates, a major supplier of financial databases to the financial services industry. An outstanding scholar, he is best known for his original estimates of the historical rates of return realised by investors in different markets and for his research on new issues.

The period studied is from the beginning of 1976 to the end of 1991. The study stopped in 1991 because dividend imputation (this tax benefit to shareholders is explained later) was introduced in 1987. The introduction of this system would have changed some of the statistics used in this chapter and made long-term comparisons difficult. As time passes there will be more history that includes the influence of dividend imputation so that the period under review will be the immediate past with sufficient data to make meaningful comparisons. While the statistics for ordinary shares before and after dividend imputation will be different, the relationship to government bonds and bank bills discussed in the chapter will not change.

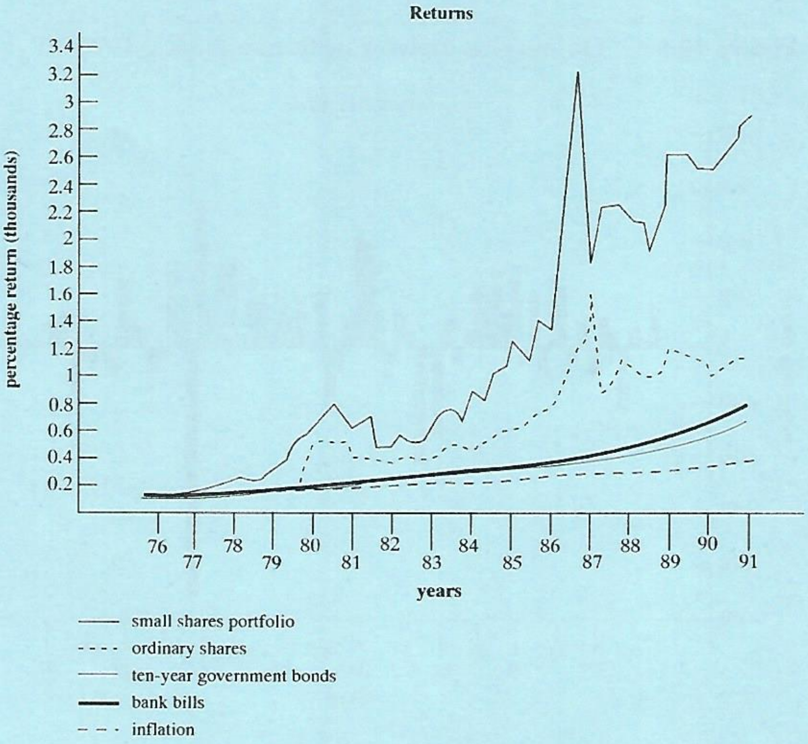
A first look

Before looking closely at the different portfolio returns, we take a look at the ‘big picture’. Figure 10.4 shows what happened to returns in these different portfolios from 1976. The growth in value for each of the different portfolios over the period is given separately. The vertical axis is scaled such that equal distances measure equal percentage (as opposed to dollar) changes in values.

Looking at Figure 10.4, we see that the 'small cap' (short for small capitalisation) investment did the best overall. Every dollar invested grew to $29.74 (approximately 3000%) over the 15 years. The larger ordinary share portfolio did less well; a dollar investment in it grew to $11.28 (approximately 1200%).

At the other end, the government bond portfolio grew to only $6.64. This is even less impressive when we consider the inflation over this period. The increase in the price level was such that $3.36 was needed just to replace the original $1.

Figure 10.4 **A $1 investment in different types of portfolio, 1976–91 (year-end 1975 = $1)**



Given the historical record, why would anybody buy anything other than small cap shares? If you look closely at Figure 10.4, you will probably see the answer. The bank bill portfolio and the long-term government bond portfolio grew more slowly than did the share portfolios, but they also grew much more steadily. The small shares ended up on top, but as you can see, they grew quite erratically at times. For example, in the 1987 share market crash, the small share portfolio lost the most value.

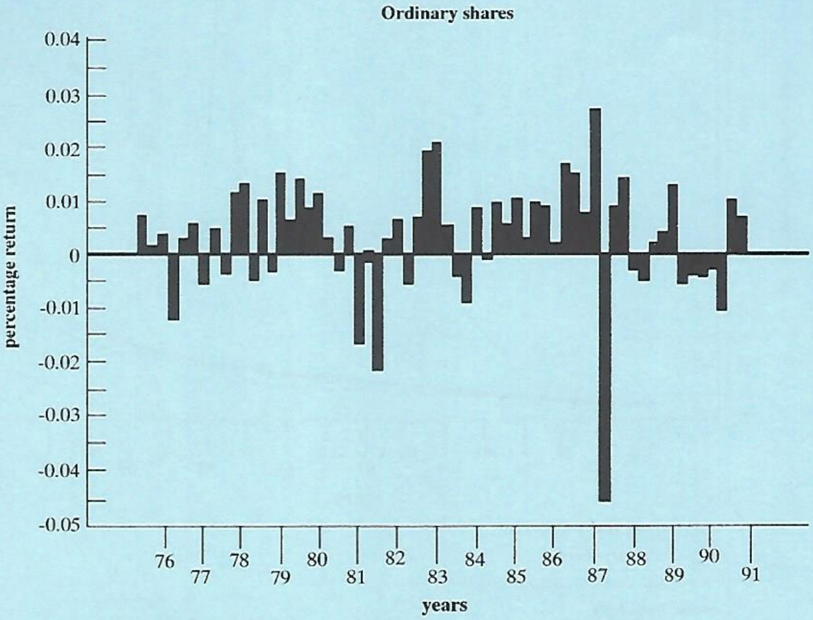
A closer look

To illustrate the variability of the different investments, Figures 10.5 to 10.8 plot the quarter-to-quarter percentage returns in the form of vertical bars drawn from the horizontal axis. The height of the bar tells us the return for the particular quarter. For example, looking at the long-term government bonds (Figure 10.7), we see the largest historical quarterly return (4.1%) occurred not so long ago (in 1982). This was a good period for bonds. In comparing these charts, notice the differences in the vertical axis scales. With this in mind, you can see how predictably the bank bills (Figure 10.7) behaved compared to the small shares (Figure 10.6).

The actual quarter-to-quarter returns used to draw these bar graphs are displayed in Table 10.1. Looking at this table, we see, for example, that the largest single-quarter return is a remarkable 45.2 per cent (negative) for the small share portfolio in the 1987 quarter that includes October.

In September quarter 1978, inflation was about 2 per cent (8% per annum equivalent), government bonds returned 2.2 per cent (or 9.4% per annum), bank bills were almost 2.5 per cent (or 10.2% per annum), large shares 'only' returned 12.7 per cent (or 61% per annum) while small shares returned 22.3 per cent (or a per annum equivalent return of 'only' 124%).

Figure 10.5 Quarter-to-quarter ordinary shares, 1976–91



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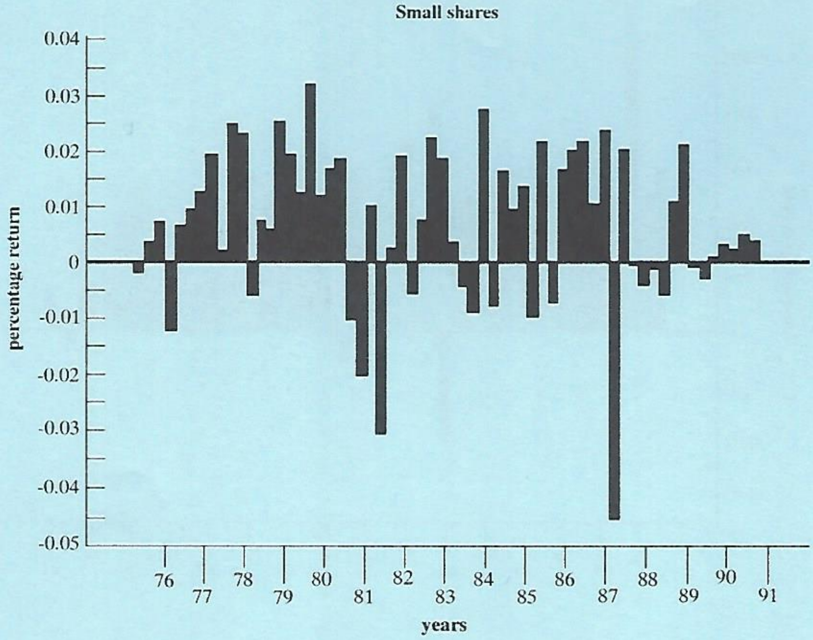
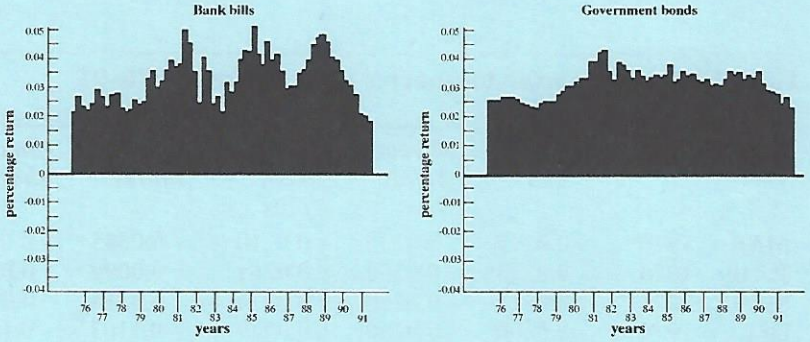
* Data collected by M. Christensen, J. McIvor and S. Thompson, School of Finance, Queensland University of Technology.

Figure 10.6 Quarter-to-quarter total returns on small company shares



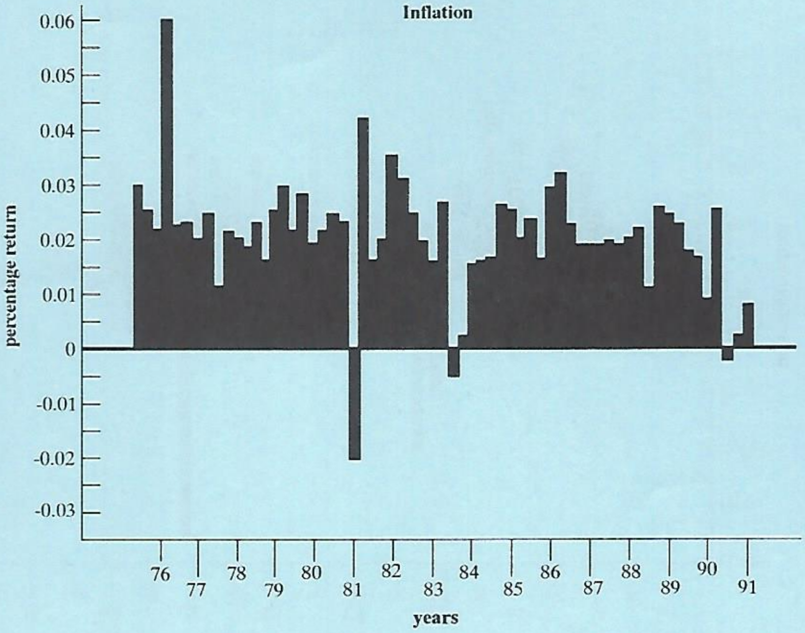
* Data collected by M. Christensen, J. McIvor and S. Thompson, School of Finance, Queensland University of Technology.

Figure 10.7 Quarter-to-quarter returns on bank bills and government bonds



* Data collected by M. Christensen, J. McIvor and S. Thompson, School of Finance, Queensland University of Technology.

Figure 10.8 Quarter-to-quarter inflation



Average returns: The first lesson

As you've probably begun to notice, the history of capital market returns is too complicated to be of much use in its undigested form. We need to begin summarising all these numbers. Accordingly, we discuss how to go about condensing the detailed data. We start out by calculating average returns.

Table 10.1 Quarter-to-quarter total returns, 1976–91

Year		*CPI*	*10-year bonds*	*90-day bank bills*	*Ordinary shares*	*Small shares*
MAR	1976	0.0297	0.0250	0.0210	0.0645	– 0.0115
JUNE	1976	0.0253	0.0250	0.0261	0.0099	0.0379
SEPT	1976	0.0217	0.0250	0.0234	0.0314	0.0680
DEC	1976	0.0600	0.0260	0.0229	– 0.1163	– 0.1312
MAR	1977	0.0228	0.0260	0.0246	0.0199	0.0626
JUNE	1977	0.0232	0.0260	0.0278	0.0473	0.0911
SEPT	1977	0.0196	0.0255	0.0265	– 0.0437	0.1203
DEC	1977	0.0239	0.0238	0.0249	0.0434	0.1807
MAR	1978	0.0125	0.0230	0.0268	– 0.0223	0.0161
JUNE	1978	0.0210	0.0228	0.0270	0.1094	0.2386
SEPT	1978	0.0194	0.0225	0.0245	0.1271	0.2239
DEC	1978	0.0222	0.0220	0.0219	– 0.0376	– 0.0588
MAR	1979	0.0171	0.0234	0.0233	0.0982	0.0873
JUNE	1979	0.0267	0.0250	0.0259	– 0.0222	0.0591
SEPT	1979	0.0234	0.0252	0.0250	0.1580	0.2461
DEC	1979	0.0297	0.0252	0.0256	0.0608	0.1897
MAR	1980	0.0218	0.0280	0.0318	0.1457	0.1220
JUNE	1980	0.0283	0.0294	0.0346	0.0824	0.3065
SEPT	1980	0.0188	0.0295	0.0288	0.1098	0.1139

DEC	1980	0.0207	0.0315	0.0315	0.0298	0.1586
MAR	1981	0.0239	0.0328	0.0370	−0.0286	0.1833
JUNE	1981	0.0220	0.0328	0.0400	0.0444	−0.0902
SEPT	1981	−0.0213	0.0375	0.0380	−0.1502	−0.2108
DEC	1981	0.0426	0.0375	0.0394	−0.0076	0.1030
MAR	1982	0.0165	0.0408	0.0499	−0.2146	−0.3106
JUNE	1982	0.0242	0.0410	0.0469	0.0217	0.0250
SEPT	1982	0.0349	0.0350	0.0353	0.0549	0.1640
DEC	1982	0.0295	0.0324	0.0246	−0.0512	−0.0500
MAR	1983	0.0221	0.0375	0.0399	0.0623	0.0803
JUNE	1983	0.0209	0.0371	0.0340	0.1838	0.0229
SEPT	1983	0.0165	0.0354	0.0268	0.1934	0.2077
DEC	1983	0.0240	0.0338	0.0226	0.0433	0.0282
MAR	1984	−0.0038	0.0354	0.0350	−0.0284	−0.0275
JUNE	1984	0.0023	0.0344	0.0320	−0.0934	−0.0835
SEPT	1984	0.0128	0.0329	0.0273	0.0941	0.2633
DEC	1984	0.0142	0.0338	0.0323	−0.0007	−0.0656
MAR	1985	0.0140	0.0345	0.0388	0.1074	0.1954
JUNE	1985	0.0239	0.0338	0.0413	0.0671	0.0760
SEPT	1985	0.0220	0.0345	0.0413	0.1168	0.1208
DEC	1985	0.0201	0.0371	0.0494	0.0333	−0.0871
MAR	1986	0.0231	0.0315	0.0405	0.1127	0.2187
JUNE	1986	0.0166	0.0324	0.0370	0.1027	−0.0494
SEPT	1986	0.0261	0.0346	0.0446	0.0150	0.1692
DEC	1986	0.0287	0.0335	0.0378	0.1702	0.2053
MAR	1987	0.0198	0.0336	0.0406	0.1472	0.2183
JUNE	1987	0.0152	0.0320	0.0334	0.0783	0.1250
SEPT	1987	0.0167	0.0313	0.0280	0.2583	0.2373
DEC	1987	0.0171	0.0321	0.0283	−0.4355	−0.4522
MAR	1988	0.0179	0.0298	0.0283	0.0833	0.2094
JUNE	1988	0.0170	0.0299	0.0329	0.1580	−0.0003
SEPT	1988	0.0190	0.0299	0.0344	−0.0233	−0.0339
DEC	1988	0.0208	0.0324	0.0380	−0.0522	−0.0072
MAR	1989	0.0097	0.0341	0.0439	0.0154	−0.0620
JUNE	1989	0.0245	0.0338	0.0458	0.0252	0.1086
SEPT	1989	0.0228	0.0341	0.0459	0.1371	0.2333
DEC	1989	0.0188	0.0323	0.0445	−0.0601	−0.0024
MAR	1990	0.0169	0.0336	0.0386	−0.0378	−0.0286
JUNE	1990	0.0162	0.0335	0.0378	−0.0396	0.0060
SEPT	1990	0.0072	0.0341	0.0339	−0.0329	0.0356
DEC	1990	0.0268	0.0301	0.0301	−0.1064	0.0249
MAR	1991	−0.0019	0.0285	0.0290	0.0932	0.0571
JUNE	1991	0.0014	0.0279	0.0263	0.0558	0.0362

Calculating average returns

A way to calculate the average returns on the different investments in Table 10.1 is simply to add up the returns and divide by 62. The result is the historical average of the individual values per quarter.

What we will do is convert the quarterly returns to an equivalent annual return and average this return.

Average returns: The historical record

Table 10.2 shows the average returns computed from Table 10.1. As shown, in a typical year, the small shares increased in value by 41.7 per cent (using an equivalent rate of return). Notice also how much larger the share returns are than the bond returns.

These averages are, of course, nominal since we haven't worried about inflation. Notice that the average inflation rate was 8.2 per cent per year over this 15-year span. The nominal return on government bonds was 13 per cent per year. The average real return on government bonds was thus approximately 4.8 per cent per year; so the real return on the bonds has been quite low historically. At the other extreme, small shares had an average real return of about 41.7% – 8.2% = 33.5% which is relatively large. Notice also that the real value of the ordinary share portfolio increased by approximately 12 per cent (20.2 – 8.2%) in a typical year.

Table 10.2 Average equivalent returns, 1976–91

Investment	*Average equivalent returns*
Ordinary shares	20.2%
Small shares	41.7
90-day bank bills	13.9
10-year government bonds	13.0
Inflation	8.2

Risk premiums

Now that we have computed some average returns, it seems logical to see how they compare with each other. Based on our discussion above, one such comparison involves government-issued securities. These are free of much of the variability we see in, for example, the share market.

The government borrows money by issuing bonds. Because the government can always raise taxes to pay its bills, this debt is virtually free of any default risk over its life. Thus, we will call the rate on such debt the risk-free return, and we will use it as a kind of benchmark.

A particularly interesting comparison involves the virtually risk-free return on government bonds and the very risky return on ordinary shares. The difference between these two returns can be interpreted as a measure of the excess return on the average risky asset (assuming that a share of a large Australian company has about average risk compared to all risky assets).

We call this the 'excess' return since it is the additional return we earn by moving from a relatively risk-free investment to a risky one. Because it can be interpreted as a reward for bearing risk, we will call it a *risk premium.*

From Table 10.2, we can calculate the risk premiums for the different investments. We report only the nominal risk premium in Table 10.3 because there is only a slight difference between the historical nominal and real risk premiums.

The risk premium on a government bond is shown as zero in the table because we have assumed that they are riskless.

The first lesson

Looking at Table 10.3, we see that the average risk premium earned by a typical large ordinary share is 20.2% – 13% = 7.2%. This is a significant reward. The fact that it exists historically is an important observation, and it is the basis of our first lesson: Risky assets, on average, earn a risk premium. Put another way, there is a reward for bearing risk.

Why is this so? Why, for example, is the risk premium for small shares so much larger than the risk premium for large shares? More generally, what determines the relative sizes of the risk premiums for the different assets? The answers to these questions are at the heart of modern finance, and the next chapter is devoted to them. For now, part of the answer can be found by looking at the historical variability of the returns of these different investments. So, to get started, we now turn our attention to measuring variability in returns.

Table 10.3 Average equivalent returns and risk premiums, 1976–91

Investment	*Average equivalent returns*	*Risk premium*
Ordinary shares	20.2%	7.2%
Small shares	41.7	28.7
90-day bank bills	13.9	0.9
10-year government bonds	13.0	0.0

Note

1 R.G. Ibbotson and R.A. Sinquefield, *Stocks, Bonds, Bills and Inflation* [SBBI] (Charlottesville, VA: Financial Analysis Research Foundation, 1982).

The variability of returns: The second lesson

S. Ross et al.

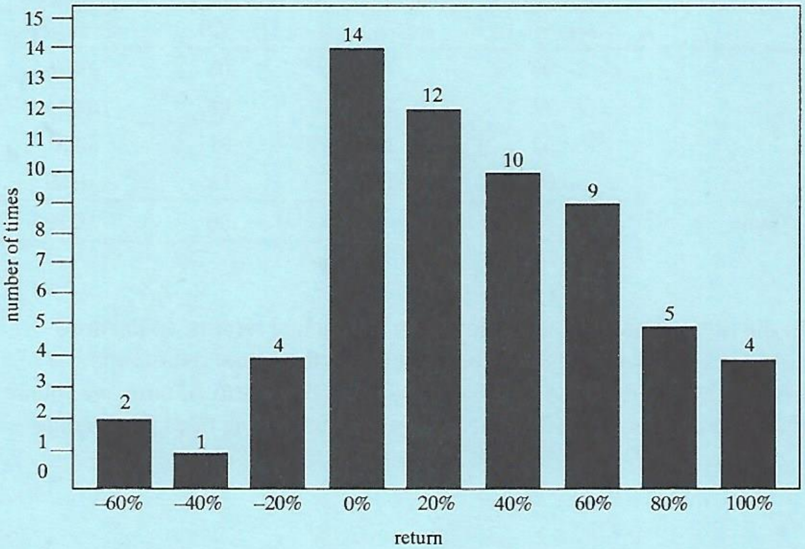
Source: Ross, S., Thompson, S., Christensen, M., Westerfield, R. & Jordan, B. 2001, *Fundamentals of Corporate Finance,* 2nd Austn edn, Irwin, Sydney, pp. 314–9.

We have already seen that the equivalent quarter-to-quarter returns on ordinary shares tend to be more volatile than the returns on long-term government bonds (compare Figures 10.5 and 10.7). We now discuss measuring this variability so we can begin examining the subject of risk.

Frequency distributions and variability

To get started, we can draw a *frequency distribution* for the ordinary share returns like the one in Figure 10.9. What we have done here is to count up the number of times that the equivalent annual return on the ordinary share portfolio falls within each 20 per cent range. For example, in Figure 10.9, the height of 10 in the range 40–60 per cent means that 10 of the 62 equivalent annual returns were in that range. Notice also that the most common return is in the range of 0–20 per cent. The ordinary share portfolio had a return in this range 14 times in 62 equivalent years.

Figure 10.9 **Frequency distribution of returns on ordinary shares, 1976–91**



What we need to do now is to actually measure the spread in returns. We know, for example, that the return on small shares in a typical year was 41.7 per cent. We now want to know how far the actual return deviates from this average in a typical year. In other words, we need a measure of how volatile the return is. The *variance* and its square root, the *standard deviation*, are the most commonly used measures of volatility. We describe how to calculate them next.

The historical variance and standard deviation

Variance—The average squared deviation between the actual return and the average return.

The variance essentially measures the average squared difference between the actual returns and the average return. The bigger this number is, the more the actual returns tend to differ from the average return. Also, the larger the variance or standard deviation is, the more spread out the returns will be.

The way that we will calculate the variance and standard deviation depends on the specific situation. In this chapter, we are looking at historical returns; so the procedure we describe here is the correct one for calculating the *historical* variance and standard deviation. If we were examining projected future returns, then the procedure would be different. We describe this procedure in the next chapter.

To illustrate how we calculate the historical variance, suppose a particular investment had returns of 10 per cent, 12 per cent, 3 per cent, and –9 per cent over the last four years. The average return is (.10 + .12 + .03 – .09)/4 = 4%. Notice that the return is never actually equal to 4 per cent. Instead, the first return deviates from the average by .10 – .04 = .06, the second return deviates from the average by .12 – .04 = .08, and so on. To compute the variance, we square each of these deviations, add them up, and divide the result by the number of returns less one, or three in this case. This information is summarised below:

	(1) Actual return	*(2) Average return*	*(3) Deviation (1) – (2)*	*(4) Squared deviation*
	.10	.04	.06	.0036
	.12	.04	.08	.0064
	.03	.04	–.01	.0001
	–.09	.04	–.13	.0169
Totals	.16		.00	.0270

In the first column, we write down the four actual returns. In the third column, we calculate the difference between the actual returns and the average by subtracting 4 per cent. Finally, in the fourth column, we square the numbers in column 3 to get the squared deviations from the average.

The variance can now be calculated by dividing .0270, the sum of the squared deviations, by the number of returns less one. Let Var(R) or σ^2 (read this as 'sigma squared') stand for the variance of the return:

$$\text{Var}(R) = \sigma^2 = .027/(4-1) = .009$$

Standard deviation—The positive square root of the variance.

The standard deviation is the square root of the variance. So, if SD(R) or σ stands for the standard deviation of return:

$$\text{SD}(R) = \sigma = \sqrt{.009} = .09487$$

The square root of the variance is used because the variance is measured in 'squared' percentages and thus is hard to interpret. The standard deviation is an ordinary percentage, so the answer here could be written as 9.487%.

In the table above, notice that the sum of the deviations is equal to zero. This will always be the case, and it provides a good way to check your work. In general, if we have T historical returns, where T is some number, we can write the historical variance as:

$$\text{Var}(R) = \frac{1}{T-1}\left[\left(R_1 - \overline{R}\right)^2 + \cdots + \left(R_T - \overline{R}\right)^2\right] \qquad (10.6)$$

This formula tells us to do just what we did above: Take each of the T individual returns $(R_1, R_2, \ldots)$ and subtract the average return, $\overline{R}_i$; square the result, and add them all up; finally, divide this total by the number of returns less one $(T-1)$. The standard deviation is always the square root of Var(R).

Example 10.3 Calculating the variance and standard deviation.

Suppose the Betworth Company and the Purehealth Company have experienced the following returns in the last four years:

Year	*Betworth returns*	*Purehealth returns*
1997	−.20	.05
1998	.50	.09
1999	.30	−.12
2000	.10	.20

What are the average returns? The variances? The standard deviations? Which investment was more volatile?

To calculate the average returns, we add up the returns and divide by four. The results are:

Betworth average return = $\overline{R}$ = .70/4 = .175

Purehealth average return = $\overline{R}$ = .22/4 = .055

To calculate the variance for Betworth, we can summarise the relevant calculations as follows:

Year	*(1) Actual return*	*(2) Average return*	*(3) Deviation (1) – (2)*	*(4) Squared deviation*
1997	–.20	.175	–.375	.140625
1998	.50	.175	.325	.105625
1999	.30	.175	.125	.015625
2000	.10	.175	–.075	.005625
Totals	.70		.00	.267500

Since there are four years of returns, we calculate the variances by dividing .2675 by (4 – 1) = 3:

	Betworth	*Purehealth*
Variance (σ^2)	.2675/3 = .0892	.0529/3 = .0176
Standard deviation (σ)	$\sqrt{.0892} = .2987$	$\sqrt{.0176} = .1327$

For practice, check that you get the same answer as we do for Purehealth. Notice that the standard deviation for Betworth, 29.87 per cent, is a little more than twice Purehealth's 13.27 per cent; Betworth is thus the more volatile investment.

The historical record

Table 10.4 summarises much of our discussion of capital market history so far. It displays average returns, standard deviations and frequency distributions of annual returns on a common scale. In Table 10.4, notice, for example, that the standard deviation for the small share portfolio (62.3% equivalent per year) is more than 30 times larger than the government bond standard deviation (2% equivalent per year). We will return to these figures momentarily.

Table 10.4 **Historical returns, standard deviations and frequency distributions, 1976–91.**

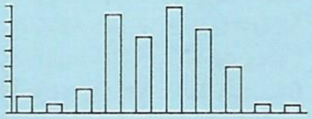
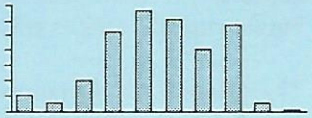
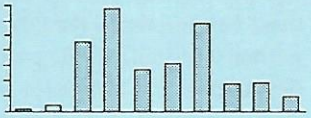
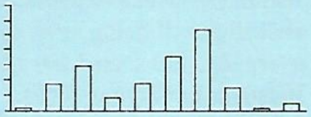
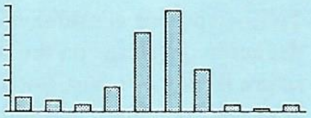
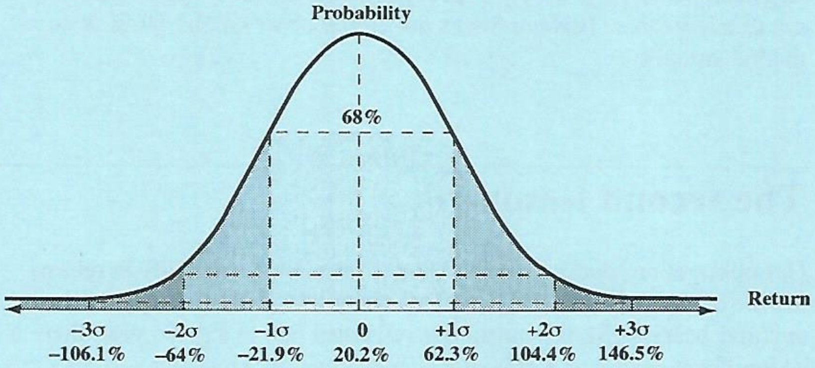
Series	*Average annual returns*	*Standard deviation*	*Distribution*
Ordinary shares	20.2%	42.1%	
Small shares	41.7%	62.3%	
Bank bills	13.9%	3.3%	
Government bonds	13.0%	2.0%	
Inflation	8.2%	4.5%	

Figure 10.10 **The normal distribution**



Normal distribution

For many different random events in nature, a particular frequency distribution, the *normal distribution* (or *bell curve),* is useful for describing the probability of ending up in a given range. For example, the idea behind 'grading on a curve' comes from the fact that exam scores often resemble a bell curve.

Normal distribution—A symmetric, bell-shaped frequency distribution that can be defined by its mean and standard deviation.

Figure 10.10 illustrates a normal distribution and its distinctive bell shape. As you can see, this distribution has a much cleaner appearance than the actual return distributions illustrated in Table 10.4. Even so, like the normal distribution, the actual distributions do appear to be at least roughly mound-shaped and symmetrical. When this is true, the normal distribution is often a very good approximation.

Also, keep in mind that the distributions in Table 10.4 are based on only 62 equivalent yearly observations, while Figure 10.10 is, in principle, based on an infinite number. So, if we had been able to observe returns for, say, 1000 years, we might have filled in a lot of the irregularities and ended up with a much smoother picture. For our purposes, it is enough to observe that the returns are at least roughly normally distributed.

The usefulness of the normal distribution stems from the fact that it is completely described by the average and standard deviation. If you have these two numbers, then there is nothing else to know. For example, with a normal distribution, the probability that we end up within one standard deviation of the average is about 2/3. The probability that we end up within two standard deviations is about 95 per cent. Finally, the probability of being more than three standard deviations away from the average is less than 1 per cent. These ranges and the probabilities are illustrated in Figure 10.10.

To see why this is useful, recall from Table 10.4 that the standard deviation of returns on the ordinary shares is 42.1 per cent. The average return is 20.2 per cent. So, assuming that the frequency distribution is at least approximately normal, the probability that the return in a given year is in the range –21.9 per cent to 62.3 per cent (20.2% plus or minus one standard deviation, 42.1%) is about 2/3. This range is illustrated in Figure 10.10. In other words, there is about one chance in three that the return will be *outside* this range. This literally tells you that, if you buy shares in large companies, you should expect to be outside this range in one year out of every three. This reinforces our earlier observations about stock market volatility.

The second lesson

Our observations concerning the quarter-to-quarter variability in returns are the basis for our second lesson from capital market history. On average, bearing risk is handsomely rewarded but, in a given year, there is a significant chance of a dramatic change in value. Thus, our second lesson is: The greater the potential reward, the greater is the risk.

Using capital market history

Based on the discussion in this section, you should begin to have an idea of the risks and rewards from investing. For example, in 1990 Government bonds were paying about 13 per cent. Suppose we had an investment that we thought had about the same risk as a portfolio of large firm ordinary shares. At a minimum, what return would this investment have to offer for us to be interested?

From Table 10.3, the risk premium on larger ordinary shares has been 7.2 per cent historically, so a reasonable estimate of our required return would be this premium plus the government bond rate, 13% + 7.2% = 20.2%. This may strike you as high but, if we were thinking of starting a new business then the risks of doing so might resemble investing in small company shares. In this case, the risk premium is 28.7 per cent, so we might require as much as 41.7 per cent from such an investment at a minimum.

We will discuss the relationship between risk and required return in more detail in the next chapter. For now, you should notice that a projected internal rate of return (IRR) on a risky investment in the 25–50 per cent range isn't particularly outstanding. It depends on how much risk there is. This, too, is an important lesson from capital market history.

Example 10.4 Investing in growth shares

The phrase *growth share* is frequently a euphemism for a small company share. Are such investments suitable for 'widows and orphans'? Before answering, you should consider the historical volatility. For example, from the historical record, what is the approximate probability that you will actually lose 18 per cent or more of your money in a single year if you buy a portfolio of such companies?

Looking back at Table 10.4, the average return on small shares is 41.7 per cent and the standard deviation is 62.3 per cent. Assuming that the returns are approximately normal, then there is about a 1/3 probability that you will experience a return outside the range –20.6 to 104 per cent (41.7% + 62.3%).

Because the normal distribution is symmetric, the odds of being above or below this range are equal. There is thus a 1/6 chance (half of 1/3) that you will lose more than –20.6 per cent. So you should expect this to happen once in every six years, on average. Such investments can thus be *very* volatile, and they are not well-suited for those who cannot afford the risk.

Cost of capital

Topic 7

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Introduction

In this topic we will consider the firm's cost of capital (also called its cost of money). As you know, firms should always cover all of their costs, and the cost of money is no exception. Firms that know their cost of capital also know that they have to invest in projects (and they should have existing projects) that achieve at least if not better than this cost, otherwise they are effectively reducing the wealth of the shareholders.

We will observe in this topic that the cost of capital is basically the minimum discount rate (or required rate of return) that firms should use in capital budgeting applications to keep the existing price of the firm's ordinary shares at the level that they presently are.

In theory, the cost of capital is fairly easy to calculate. You will see however that there are many subjective judgments that will be made in estimating the firm's cost of capital.

An important concept discussed in this topic is the weighted average cost of capital (WACC). The WACC is the weighted average cost of the firm's debt, preference shares and ordinary shares employed in the business. You will also see that taxes are an important consideration in determining the WACC.

You will learn how the weighted average cost of capital is not necessarily the best discount rate to use if the risk profile of a new investment project is different to the risk profile, on average, of the existing investments of the firm.

The costs of raising additional capital are also discussed and you will see how these impact on project costs rather than on the weighted average cost of capital.

The cost of capital—A business perspective

Renée Garbus—Director of Capital Planning and Investment, PepsiCo

At PepsiCo, we pay very close attention to our cost of capital. It serves as a basis for making financial decisions and selecting capital investments. It's also a factor in our ability to achieve our ultimate goal: creating shareholder value. As shareholders (all PepsiCo employees receive stock options), we have strong motivation to succeed.

My team is responsible for monitoring cost of capital and keeping it as low as possible. We are responsible for keeping up with mainstream financial thinking and identifying improved approaches. In fact, our financial managers often consult their textbooks and use financial theory for guidance, and then put it into a practical framework.

PepsiCo has three distinct business segments—beverages, snacks and restaurants. We calculate the weighted average cost of capital (WACC) for each segment and then determine PepsiCo's overall WACC by applying a weighting equal to the relative weight of each business in the total valuation of the firm.

The most difficult part is determining cost of equity. We use the capital asset pricing model (CAPM) and calculate a beta for each business through an analysis of industry peers. In weighting the cost of debt and equity, we use our target capital structure (mix of debt and equity) measured on a market value basis. Unlike book value this provides the best estimate of the actual amounts that would be received from selling the given securities today.

We calculate our cost of capital every quarter. Recently, declining interest rates have helped reduce our cost of capital. One way to keep our cost of capital down is by aggressively using debt in our capital structure. The tax deductibility of interest makes debt an attractive source of capital. And with over $1.5 billion of operating cash flow, we can service a lot of debt relatively easily.

The cost of capital, plus a slight premium, determines the hurdle rate for US investments. PepsiCo's divisions use the rate to select among those investments that fit our strategy.

International hurdle rates are derived based on inflation differentials, and in developing markets we add a country risk premium. As PepsiCo continues to grow internationally, we'll have to consider whether we should refine this approach by looking at 'local' cost of capital on a country-by-country basis.

Renée Garbus joined PepsiCo's corporate finance department in 1986 and is Director of Capital Planning and Investment. She received a B.A. in Economics from Union College and an M.B.A. in Finance from New York University.

Source: Gitman 1997, p. 427.

Objectives

At the completion of this topic you should be able to:

- calculate the cost of equity capital using the dividend growth model and the security market line approach;
- calculate the cost of debt and the cost of preference shares;
- calculate and explain the concept of weighted average cost of capital;
- outline how franked dividends may impact on the cost of equity capital;
- explain how project and divisional costs of capital may be different from the company's overall weighted average cost of capital; and
- describe how flotation costs impact on a project analysis.

Learning resources

Textbook

Ross, S.A., Westerfield, R.W. & Jordan, B.D. 2000
Fundamentals of Corporate Finance
5th edn, Irwin McGraw-Hill, Boston, chapter 14.

Readings

Herald Sun 1998
'Las Vegas hotels get that empty feeling'
28 Dec., p. 78.

Maruca, R. F. 1996
'The cost of capital',
Harvard Business Review
Sept./Oct., vol. 74, no. 5, pp. 9–10 (illustrations not included).

Key concepts

The following key concepts are introduced and developed in this topic:

- cost of capital;
- cost of equity;
- franked dividends;
- weighted average cost of capital;
- divisional costs of capital; and
- flotation costs.

Some preliminaries to the cost of capital

Before we get into the actual calculation of the costs of capital for a firm we need to discuss and understand some basic issues regarding the cost of capital. These issues are highlighted in the following reading from Ross et al. (2000).

Reading

Please read the introduction to Chapter 14 and 'The cost of capital: Some preliminaries' (Section 14.1) in Ross et al. 2000, pp. 418–20. You should note:

- **the correct discount rate to use when evaluating investment opportunities depends on the riskiness of the project (p. 418);**
- **the riskiness of the project helps determine the required rate of return on the project (p. 418);**
- **the minimum required rate of return on the project is synonymous with what the cost of capital will be on that project (p. 418);**
- **the cost of capital to a firm is essentially the required rate of return demanded by the providers of capital to the firm (p. 419);**
- **the expressions 'required rate of return', 'cost of capital' and 'an appropriate discount rate' can be used interchangeably (p. 419);**

- **the cost of capital depends primarily on the use of funds rather than the source of funds—the more risky the use, the more the cost of capital will be (p. 419);**
- **we assume in this topic that the company has a target debt-to-equity capital structure and that it will maintain that target capital structure (p. 420); and**
- **the cost of capital will be the cost of the debt capital and the equity capital (p. 420).**

Cost of equity

In this section, we will consider the cost of equity. The cost of equity is the required rate of return by equity providers (the providers of share capital) for investing in our company. There are two principal methods of estimating the cost of equity. The first is called the dividend valuation model and the second is called the security market line approach (SML) or the capital asset pricing model (CAPM). These will look familiar because we have seen them before. The dividend valuation model was discussed in Topic 3 and the SML and CAPM were discussed in Topic 6.

Reading

Please read 'The cost of equity' (Section 14.2) in Ross et al. 2000, pp. 420–4. You should note:

- **there is no way of directly observing the return that the firm's equity providers require on their investment. We will try to estimate it (p. 420);**
- **the element of growth (g) can be estimated using historical growth rates or financial analysts' forecasts of future growth rates (p. 420);**
- **how to use the dividend valuation model (or dividend growth model or Gordon growth model) to help determine the cost of the equity (pp. 420–1 and Equation 14.1);**
- **the advantages of using the dividend growth model are that it is easy to understand and easy to use (p. 422);**
- **there are basically three disadvantages in using the dividend growth model. Firstly, it is only applicable to dividend-paying companies and to companies in which the dividend grows at a reasonably constant rate. Secondly, the estimated cost of equity is very sensitive to the estimated growth rate. Thirdly, the dividend growth model does not explicitly consider risk (p. 422);**
- **how to calculate cost of equity capital using the security market line approach (pp. 422–3 and Equation 14.2);**
- **the advantages of using the security market line approach are two. Firstly, the cost of capital is adjusted for risk and, secondly, it is used on companies that pay no dividends and on those that don't have a reasonably steady dividend growth rate (p. 423);**

- **the disadvantages of the security market line approach are two. Firstly, it requires us to estimate the market risk premium (the risk premium for investing in the financial market) and, secondly, we have to try to estimate the beta (p. 422); and**
- **using both approaches, the dividend growth model and the security market line, might be useful (p. 422).**

Exercise 7.1

Attempt 'Chapter review and self-test problem' 14.1 (p. 439), 'Concepts review and critical thinking questions' 5 and 6 (p. 441) and 'Questions and problems' 1, 2, 3 and 4 (p. 442) in Ross et al. 2000.

Exercise 7.2

Find out who in your organisation might be responsible for calculating the cost of equity. Ask them what the cost of equity capital is and ask how they arrived at that figure. Ask them if they use the dividend valuation model or the security market line approach to help determine the company's cost of equity. If they do not use either of these two approaches, ask them why not.

If you work in a non-profit organisation, find out if your organisation still requires you to have a rate of return that in some way compensates the providers of the 'equity' capital.

The cost of debt and preference shares

In addition to equity capital, many companies use debt capital and to a lesser extent they may use preference share (or preference stock) capital. We need to understand how the costs of these two sources of capital impact on the overall cost of capital (and hence the required rate of return) of a company.

Reading

Please read 'The costs of debt and preferred stock' (Section 14.3) in Ross et al. 2000, pp. 424–5. You should note the following points:

- **the cost of debt is defined as the return that the lenders to the firm demand on their lending debt capital to the firm (p. 424).** ***You should use the expression 'debt providers' rather than the expression 'creditors' used by Ross in the first paragraph on p. 424 under the heading 'The cost of debt'. Creditors are more commonly known in Australia as the suppliers of short-term credit for the purposes of funding inventory purchases whereas the expression 'debt providers' is broader and encompasses all those who provide debt capital;***
- **the cost of debt is simply the interest rate that the company must pay on new borrowings (p. 424);**
- **you should use the current cost of debt rather than the historical or coupon rate that was offered at the time the debt capital was raised (p. 424); and**
- **the cost of preference stock is the fixed dividend payable divided by the current price of the preference stock (p. 425 and Equation 14.3).**

Exercise 7.3

Attempt 'Questions and problems' 5, 6, 7 and 8 in Ross et al. 2000, p. 442. Do not calculate the after-tax cost of debt for each of the questions at this time.

Exercise 7.4

Find out who in your organisation might be responsible for calculating the cost of debt and preference capital. Ask them what the cost of debt and preference capital is and ask how they arrived at those figures.

The weighted average cost of capital

In the above discussion we examined the costs of the major sources of a company's capital. In this section we will determine how the mix of the debt and the equity impacts on the overall cost of capital for a company, also called its weighted average cost of capital (WACC). Notice also that we will be focusing on the sources of long-term capital only. The sources of long-term capital, or core capital, which fund a company's investment activities are normally long-term debt, preference shares and ordinary shares. Short-term debt is not discussed on the assumption that it is not core capital. If it was indeed core capital then you would need to include this debt with the long-term debt.

Taking a bit out of Apple

As sales continued to fall at beleaguered Apple Computer Inc., the company revealed in mid-February 1996 that it expected gross profit margins, already at 16 per cent, a very low level, to shrivel even more. Apple reported a $69 million loss for the quarter ended 29 December 1995, due to a large supply of unsold computers and price wars, and was forced to eliminate its dividend on its ordinary equity to conserve cash. The poor financial performance and takeover rumours contributed to customer concern about the company's future, further eroding the company's revenues. Apple also said that its ability to obtain traditional financing was becoming more difficult because these problems would raise its cost of capital in the near term. As a result, it planned to look for financing alternatives to ensure the company's continued liquidity.

Source: Gitman et al. 1998, p. 425.

Reading

Please read 'The weighted average cost of capital' (Section 14.4) in Ross et al. 2000, pp. 425–32 .You should note:

- **how to calculate capital structure weights (p. 426);**
- **the weighted average cost of capital for the firm should really be calculated on an after-tax basis (pp. 426–7);**
- **how to calculate the after-tax cost of debt (p. 427);**
- **how to calculate the weighted average cost of capital (pp. 428–30);**
- **the need to use market value capital structure weights rather than book value capital structure weights (p. 429);**

- **the need to understand the riskiness (or risk class) of the project that is being considered for investment and whether it is of the same risk class as the overall firm (pp. 430–1); and**

- **another use for WACC is in performance evaluation in an area such as economic value added (EVA) developed by Stern Stewart and Co. (pp. 431–2).**

Exercise 7.5

Now calculate the after-tax cost of debt for each of 'Questions and problems' 5, 6. 7 and 8 which you attempted in Exercise 7.3. Attempt 'Chapter review and self-test problem' 14.2 (pp. 439–40), 'Concepts review and critical thinking questions' 1, 2, 3 and 7 (pp. 440–1) and 'Questions and problems' 9, 10, 11, 12, 13, 14, 15, (pp. 442–3) in Ross et al. 2000.

Exercise 7.6

Find out who in your organisation might be responsible for calculating the weighted average cost of capital. Ask them what the WACC is and ask how they arrived at that figure.

Reading

Please read Maruca 1996, 'The cost of capital' to learn generally how companies in the USA estimate their cost of capital. Detailed note-taking is not required.

A further note on taxes and the WACC

You will recall that in Topic 4, 'An introduction to capital budgeting', we were always concerned with calculating after-tax cash flows and then discounting these cash flows. Because the cash flows were after tax we also needed to be sure that the required rate of return (and discount rate) was also expressed on an after-tax basis. We have also discussed (in the previous section) that the appropriate required rate of return or discount rate should be the weighted average cost of capital which is made up of the after-tax costs of debt and equity (and perhaps preference shares). This is true, we suggested, so long as the risk profile of the investment being considered has a similar risk profile to the existing investments (or assets) of the firm.

Let us review each of the elements of the WACC—the after-tax cost of debt, the after-tax cost of equity and the after-tax cost of preference shares—just to make sure that you understand the tax implications behind them.

The after-tax cost of debt

You should understand that interest is tax deductible and it is a 'before-tax' cost. Hence, the after-tax cost of debt using the formula Cost of debt = $R_D \times (1 - T_c)$ is appropriate, where:

R_D = pre-tax cost of debt; and

T_c = company tax rate.

The after-tax cost of equity

You know from the prescribed text that companies pay dividends on an 'after-tax basis' meaning they pay their taxes on profits earned first and then they pay dividends to their shareholders. The payment of dividends is not mandatory but, as you will see in Topic 10, many companies pay dividends. In Australia, resident Australian shareholders who receive dividends from the profits that have already borne company tax are entitled to claim a credit for that tax paid by the company. This credit is called a franking credit and is quite valuable to the shareholders. Companies that have paid tax at a tax rate of 36% and distributed all of the profits by way of dividends to shareholders pass on to the shareholders what is known as a fully franked dividend. Because of the dividend system in Australia, we might have to take this into account in using the estimated cost of equity formulae that we used above. The dividend valuation model and the security market line approach need to be adjusted if we want to arrive at a *before company-tax cost of equity*.

Look at the following example:

Assume that we are considering investing in a company that paid a fully franked dividend of $1 last year ($D_o$). The anticipated growth rate in dividends (g) is 10% and the current market price of the shares is $22.00. Assume also that the shareholders continue to expect fully franked dividends. We would have the following expected return (R_E):

$$R_E = \frac{D_1}{P_o} + g$$

$$= \frac{\$1.10}{\$22} + .10$$

$$= 15\%$$

The expected return (R_E) to the shareholders of 15% has been calculated on an after-tax basis. Clearly, the company must earn more than this 15% on its investments (before tax) to be able to pass on a 15% fully franked return to its shareholders. What should the company's expected before-tax return be? The dividend must be higher by the company tax rate. Assume the company tax rate (T_c) is 36%. The company's expected return (and hence its cost of capital) on a before-tax basis should be:

$$R_E = \frac{D_1/(1-T_c)}{P_o} + g$$

$$R_E = \frac{\$1.10/(1-.36)}{\$22} + .10$$

$$= 17.8\%$$

Note that the 'grossing up' of the dividend gives us the correct answer. Why?

If the company expects to pay a dividend of $1.10 per share in after-tax profits it must earn $1.71875 per share in before-tax profits. If it earns $1.71875 per share in before-tax profits, then pays tax of 36% on this (61.875 cents) it will be able to pay an after-tax dividend to shareholders of $1.10.

Let's perform a similar calculation on the expected return by shareholders (R_E) using the security market line approach now also.

Assume the above company has a beta of 1.2, the risk-free rate in the market is 5% and the expected return from the financial market is 15%—what would the required rate of return by shareholders be, using the above the information?

$$R_E = R_f + \beta(R_M - R_f)$$

$$= .05 + 1.2(.15 - .05)$$

$$= .05 + .12$$

$$= .17 \text{ or } 17\%$$

Again, this would be the required rate of return by shareholders on an after-company-tax basis. So, to estimate the required rate of return by the company on a before-tax basis we would need to gross up the dividends. We need to make further assumptions. The expected return from the market (R_M) of 15% may be made up of an expected 5% fully franked dividend and an expected 10% capital gain. The 5% fully franked dividend would need to be grossed up and would equal 5%/(1 – T_c), or 5%/(1 –.36), or .78125%.

Given the above (including the fact that shareholders expect a 5% fully franked dividend), the company would now be looking at a before-tax required rate of return on its investments of:

$$R_E = R_f + \beta_E \times (R_M - R_f)$$

$$= .05 + 1.2(.178125 - .05)$$

$$= .05 + 1.2\ (.128125)$$

$$= .20375 \text{ or } 20.375\%$$

Even though the above calculations are fairly straightforward, deriving the numbers behind the calculations is not. As we have already suggested, trying to estimate the risk-free rate, the expected return from the financial market and the beta are very difficult propositions indeed.

In the discussion above we have made two more assumptions. Firstly, that companies pay tax (and to pass on a fully franked dividend, they have paid tax at the rate of 36% of their profits) and, secondly, that shareholders expect to receive franked dividends (if not fully franked dividends). These assumptions and these expectations may not always turn out to be a reality. There is one other major assumption behind the above calculations. That is, that the shareholder is able to utilise the franking credit. As you will see in Topic 10, foreign investors are not able to utilise the franking credits and certainly there may also be resident Australian shareholders who may also not be able to utilise the credit.

We will try to make our calculations easier and to avoid these extra assumptions. *You can assume for the rest of this topic that the estimate of the cost of equity is on an after-company-tax basis.* Assume that the assumptions behind company-tax payments, the expectations of shareholders regarding fully franked dividends and the ability of the shareholders to utilise the franking credits have been factored in to the estimated after-tax cost of equity. You should remember, however, that the cost of equity capital for a company may be higher than our calculations suggest if companies that usually pay franked dividends, for some reason become unable to continue paying them and the shareholders continue to expect franked dividends.

The after-tax cost of preference shares

Preference dividends are always paid after the company tax is paid. Because of this, the after-tax cost of the preference shares is found by dividing the annual percentage preference dividend by the market value of the preference share. Mathematically this is presented by:

$$R_p = \frac{D}{P_0}$$

Divisional and project costs of capital

Many companies come across projects which are much less risky, or much more risky, on average than the projects they are undertaking presently. Should the weighted average cost of capital of the company as a whole be the discount rate applied to these sorts of projects? Similarly, many companies have different operating divisions. This may be because those companies have different business activities being conducted by those divisions or perhaps those divisions are based in different countries around the world. Should the weighted average cost of capital of the company as a whole be the discount rate for all of the divisions?

Reading

Please read 'Divisional and project costs of capital' (Section 14.5) in Ross et al. 2000, pp. 432–5. You should note:

- **When evaluating investments with risks that are substantially different from the overall firm, the use of the weighted average cost of capital will lead to poor investment decisions (p. 432).**
- **The systematic risk of the new projects should really be taken into account (pp. 432–3).**
- **The systematic risk of each of the divisions should really be taken into account (p. 433).**
- **The concept of the pure play approach suggests that the use of the weighted average cost of capital is unique to a particular project, based on companies in similar lines of business (p. 434).**
- **The subjective approach allows projects to be placed into one of many risk classes and then suggests some adjustment to the discount rate to reflect the risk (pp. 434–5).**

Exercise 7.7

Attempt 'Concepts review and critical thinking questions' 8, 9 and 10 (pp. 441–2) and 'Questions and problems' 17 (p. 444) in Ross et al. 2000.

Exercise 7.8

Find out if your company (or a company you are interested in) uses different discount rates to reflect different project risks or different divisional costs of capital. If not, try to find out why.

Flotation costs and the WACC

Often there are times when a company accepts a new project and may need to raise additional capital. The raising of this additional capital may mean that the company may incur some costs, which we call *flotation costs*. The purpose of this next section is to analyse how these flotation costs are incorporated into the project analysis rather than into the WACC.

Reading

Please read 'Flotation costs and the weighted average cost of capital' (Section 14.6) in Ross et al. 2000, pp. 436–9. You should note:

- **how to calculate the weighted average flotation cost (pp. 436–8 and Equation 14.7); and**
- **that the costs of flotation are included in the project cost rather than into the weighted average cost of capital (p. 438–9).**

Exercise 7.9

Attempt 'Chapter review and self-test problem' 14.3 (p. 440) and 'Questions and problems' 18 and 19 (p. 444) in Ross et al. 2000.

Summary

In this topic we discussed the weighted average cost of capital and all of its components. We discussed the after-tax cost of debt, the after-tax cost of equity and the after-tax cost of preference shares. The weighted average cost of capital was the overall cost of capital to the firm and we suggested that it is the required rate of return by the firm. It was also suggested that this required rate of return could act as the appropriate discount rate for evaluating the after-tax cash flows on projects so long as those projects had a similar risk profile, on average, to the projects that the firm is undertaking presently.

We cautioned you about estimating the after-tax cost of the equity which was the most difficult part of the calculation of the weighted average cost of capital. The techniques offered were able to calculate precise after-tax costs of equity capital, but it should be remembered that those resulting after-tax costs of equity are approximations, due to the many assumptions behind them.

You should now also be aware of the situations in which it may not be appropriate to use the weighted average cost of capital as the discount rate. This is likely to be because the risk profile of projects considered by the firm or divisions of the firm may well be different to the risk profile of the overall firm.

Finally, we mentioned that the flotation costs should not cause an increase in the weighted average cost of capital but rather should be included in the project cost when doing a net present value analysis.

Reading

Please read Herald Sun 1998, 'Las Vegas hotels get that empty feeling'. People still consider investing large amounts of money where the risk is that earnings may not be better than the cost of capital. Interesting, isn't it?

Review question

Review question 7.1

You should now attempt 'Questions and problems' 23 in Ross et al. 2000, pp. 445–6. It is a comprehensive project-evaluation problem bringing together many issues that you have learned in the unit so far. You should allow 30 to 60 minutes for it.

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Suggested answers

Topic
7

Exercises

Exercise 7.1

Answers to 'Concepts review and critical thinking questions'

5. The primary advantage of the DCF model is its simplicity. The method is disadvantaged in that (1) the model is applicable only to firms that actually pay dividends; many do not; (2) even if a firm does pay dividends, the DCF model requires a constant dividend growth rate forever; (3) the estimated cost of equity from this method is very sensitive to changes in *g*, which is a very uncertain parameter; and (4) the model does not explicitly consider risk, although risk is implicitly considered to the extent that the market has impounded the relevant risk of the stock into its market price. While the share price and most recent dividend can be observed in the market, the dividend growth rate must be estimated. Two common methods of estimating *g* are to use analysts' earnings and payout forecasts, or determine some appropriate average historical *g* from the firm's available data.

6. Two primary advantages of the SML approach are that the model explicitly incorporates the relevant risk of the stock, and the method is more widely applicable than is the DCF model, since the SML doesn't make any assumptions about the firm's dividends. The primary disadvantages of the SML method are (1) three parameters, the risk-free rate, the expected return on the market, and beta must be estimated, and (2) the method essentially uses historical information to estimate these parameters. The risk-free rate is usually estimated to be the yield on very short maturity T-bills and is hence observable; the market risk premium is usually estimated from historical risk premiums and hence is not observable. The stock beta, which is unobservable, is usually estimated either by determining some average historical beta from the firm and the market's return data, or using beta estimates provided by analysts and investment firms.

Answers to 'Questions and problems'

1. $R_E = [\$1.85(1.07)/\$35] + .07 = 12.66\%$

2. $R_E = .05 + 1.20(.13 - .05) = 14.60\%$

3. $R_{E1} = .055 + 1.25(.08) = .1550$; $R_{E2} = [\$2.20(1.04)/\$40] + .04 = .0972$
   $R_E = (.1550 + .0972)/2 = 12.61\%$

4. $g_1 = (.40 - .35)/.35 = .1429$; $g_2 = (.45 - .40)/.40 = .1250$
$g_3 = (.50 - .45)/.45 = .1111$; $g_3 = (.60 - .50)/.50 = .2000$
$g = (.1429 + .1250 + .1111 + .2000)/4 = .1448$
$R_E = [\$0.60(1.1448)/\$10.00] + .1448 = 21.35\%$

Exercise 7.3

5. $R_p = \$8/\$95 = 8.42\%$

6. $P_0 = \$850 = \$27.50(\text{PVIFA}_{R\%,14}) + \$1000(\text{PVIF}_{R\%,14})$; $R = 4.188\%$
pre-tax cost of debt = YTM = 2(4.188) = 8.375%
$R_D = .08375(1 - .38) = 5.193\%$

7. (a) $P_0 = \$1040 = \$35(\text{PVIFA}_{R\%,38}) + \$1000(\text{PVIF}_{R\%,38})$; $R = 3.313\%$
pre-tax cost of debt = YTM = 2(3.313) = 6.627%

(b) $R_D = .06627(1 - .35) = 4.307\%$

(c) The after-tax rate is more relevant because that is the actual cost to the company.

8. $BV_D = \$20\text{M} + \$70\text{M} = \$90\text{M}$
$MV_D = 1.04(\$20\text{M}) + 0.76(\$70\text{M}) = \$74\text{M}$
$P_Z = \$760 = \$1000(\text{PVIF}_{R\%,5})$; $R = 5.642\%$; $R_Z = .05642(1 - .35)$
$= 3.667\%$
$R_D = 0.04307(20.8/74) + 0.03667(53.2/74) = 3.847\%$

Exercise 7.5

1. It is the minimum rate of return the firm must earn overall on its existing assets. If it earns more than this, value is created.

2. Book values for debt are likely to be much closer to market values than are equity book values.

3. No. The cost of capital depends on the risk of the project, not the source of the money.

7. The appropriate after-tax cost of debt to the company is the interest rate it would have to pay if it were to issue new debt today. Hence, if the YTM on outstanding bonds of the company is observed, the company has an accurate estimate of its cost of debt. If the debt is privately placed, the firm could still estimate its cost of debt by (1) looking at the cost of debt for similar firms in similar risk classes, (2) looking at the average debt cost for firms with the same credit rating (assuming the firm's private debt is rated), or (3) consulting analysts and investment bankers. Even if the debt is publicly traded, an additional complication occurs when the firm has more than one issue outstanding; these issues rarely have the same yield because no two issues are ever completely homogeneous.

9. (a) $\text{WACC} = .55(.18) + .10(.065) + .35(.09)(1 - .35) = 12.60\%$

(b) Since interest is tax deductible and dividends are not, we must look at the after-tax cost of debt, which is .09(1 − .35) = 5.85%. Hence, on an after-tax basis, debt is cheaper than the preferred stock.

10. $\text{WACC} = .18(.6667) + .11(.3334)(1 - .35) = 14.38\%$

11. $\text{WACC} = .1040 = .13(E/V) + .11(D/V)(1 - .35)$
$.1040(V/E) = .13 + .11(.65)(D/E)$
$.1040(D/E + 1) = .13 + .0715(D/E)$; $.0325(D/E) = .0260$; $D/E = .80$

12. (a) $BV_E = 8.2\text{M}(\$23) = \$188.6\text{M}$; $BV_D = \$70\text{M} + \$50\text{M} = \$120\text{M}$
$V = 188.6 + 120 = \$308.6\text{M}$: $E/V = 188.6/308.6 = 0.6111$;
$D/V = 1 - E/V = 0.3889$

(b) $MV_E = 8.2\text{M}(\$32) = \$262.4\text{M}$; $MV_D = 0.86(\$70\text{M}) + 0.82(\$50\text{M}) =$
$\$101.2\text{M}$
$V = 262.4 + 101.2 = \$363.6\text{M}$: $E/V = 262.4/363.6 = 0.722$;
$D/V = 1 - E/V = 0.278$

(c) The market value weights are more relevant.

13. $R_E = [\$2.00(1.06)/\$32] + .06 = .1262$
$P_1 = \$860 = \$35(\text{PVIFA}_{R\%,20}) + \$1000(\text{PVIF}_{R\%,20})$; $R = 4.5841\%$,
$\text{YTM} = 9.1683\%$
$P_2 = \$820 = \$32.5(\text{PVIFA}_{R\%,12}) + \$1000(\text{PVIF}_{R\%,12})$; $R = 5.3174\%$,
$\text{YTM} = 10.6347\%$
$R_D = (1 - .35)[(.5949)(.091683) + (.4051)(.106347)] = .0635$
$\text{WACC} = .7216(.1262) + .2784(.0635) = 10.88\%$

14. (a) $\text{WACC} = .1078 = (.4)(.18) + (.6)(1 - .35)R_D$; $R_D = 9.179\%$
$\text{WACC} = .1078 = (.4)R_E + (.6)(.075)$; $R_E = 15.70\%$

15. $MV_D = 4000(\$1000)(1.01) = \$4.04\text{M}$; $MV_E = 50\ 000(\$62) = \$3.1\text{M}$
$MV_P = 9000(\$60) = \$0.540\text{M}$; $V = 4.040\text{M} + 3.10\text{M} + 0.540\text{M} = \$7.68\text{M}$
$R_E = .06 + 1.10(.05) = 11.50\%$
$P_0 = \$1010 = \$40(\text{PVIFA}_{R\%,20}) + \$1000(\text{PVIF}_{R\%,20})$; $R = 3.927\%$,
$\text{YTM} = 7.854\%$
$R_D = (1 - .35)(.07854) = 5.105\%$
$R_p = \$4/\$60 = 6.67\%$
$\text{WACC} = .05105(4.040/7.68) + .115(3.1/7.68) + .0667(0.54/7.68) =$
7.80%

Exercise 7.7

8. (a) This only considers the dividend yield component and ignores the capital gain yield component of the required return on equity.

(b) This is the current yield only, not the promised yield to maturity. In addition, it is based on the book value of the liability, and it ignores taxes.

(c) Equity is inherently more risky than debt (except, perhaps, in the unusual case where a firm's assets have a negative beta). For this reason, the cost of equity exceeds the cost of debt. Additionally, he is basing his decision on incorrect calculations for the cost of debt and the cost of equity.

9. $R_{sup} = .12 + .75(.08) = 18\%$

Both should proceed. The appropriate discount rate does not depend on which company is investing; it depends on the risk of the project. Since Superior is in the business, it is closer to a pure play. Therefore, its cost of capital should be used. With an 18% cost of capital, the project has an NPV of $1 million regardless of who takes it.

10. If the different operating division were in much different risk classes, then separate cost of capital figures should be used for the different divisions; the use of a single, overall cost of capital would be inappropriate. If the single hurdle rate were used, riskier divisions would tend to receive funds for investment projects, since their return would exceed the hurdle rate despite the fact that they may actually plot below

the SML and hence be unprofitable projects on a risk-adjusted basis. The typical problem encountered in estimating the cost of capital for a division is that it rarely has its own securities traded on the market, so it is difficult to observe the market's valuation of the risk of the division. Two typical ways around this are to use a pure play proxy for the division, or to use subjective adjustments of the overall firm hurdle rate based on the perceived risk of the division.

17. (a) Projects X, Y and Z.

(b) Using the firm's overall cost of capital as a hurdle rate, projects Y and Z. However, after considering risk via the SML:
$E[W] = .05 + .60(.12 - .05) = .0920 < .11$, so accept W.
$E[X] = .05 + .85(.12 - .05) = .1095 < .13$, so accept X.
$E[Y] = .05 + 1.15(.12 - .05) = .1305 > .13$, so reject Y.
$E[Z] = .05 + 1.50(.12 - .05) = .1550 < .19$, so accept Z.

(c) Project W would be incorrectly rejected; project Y would be incorrectly accepted.

Exercise 7.9

18. (a) He should look at the weighted average flotation cost, not just the debt cost.

(b) $f_T = .06(1/2) + .16(1/2) = .110$

(c) $X(1 - .110) = \$3.5\text{M}$; $X = \text{cost} = 3.5\text{M}/(1 - .110) = \$3.933\text{M}$
Even if the specific funds are actually being raised completely from debt, the flotation costs and hence true investment cost should be valued as if the firm's target capital structure is used.

19. $f_T = .60(.12) + .10(.07) + .30(.05) = .094$
$X(1 - .094) = \$7.5\text{M}$; $X = \text{cost} = 7.5/(1 - .094) = \$8.278\text{M}$

Review question

Review question 7.1

23. The $6 million cost of the land three years ago is a sunk cost and irrelevant; the $1.30M appraised value of the land is an opportunity cost and is relevant. The relevant market value capitalisation weights are:

$MV_D = 10\,000(\$1000)(0.92) = \$9.2\text{M}$; $MV_E = 250\,000(\$55) = \$13.75\text{M}$
$MV_P = 10\,000(\$85) = \$850\,000$; $V = 9.2\text{M} + 13.75\text{M} + .85\text{M} = \$23.8\text{M}$
$R_E = .05 + 1.4(.07) = 14.80\%$
$P_0 = \$920 = \$35(\text{PVIFA}_{R\%,30}) + \$1000(\text{PVIF}_{R\%,30})$;
$R = 3.96\%$, $\text{YTM} = 7.92\%$
$R_D = (1 - .34)(.0792) = 5.23\%$
$R_p = \$6/\$85 = 7.06\%$

(a) $f_T = (13.75/23.8)(.14) + (.85/23.8)(.09) + (9.2/23.8)(.05) = .1034$
$X(1 - .1034) = \$6.5\text{M}$; $X = \text{cost} = 6.5/(1 - .1034) = \$7\,249\,610$
$CF_0 = -\$1.30\text{M} - \$7\,249\,610 - \$750\,000 = -\$9\,299\,610$

(b) $\text{WACC} = .02 + \{(13.75/23.8)(.148) + (.85/23.8)(.0706) + (9.2/23.8)(.0523)\} = .1282$

(c) $BV_5 = \$2\,437\,500$; after-tax salvage value $= \$2\text{M} + .34(\$2\,437\,500 - \$2\text{M}) = \$2\,148\,750$

(d) $\text{OCF} = [(P - v)Q - FC](1 - t) + tD$
$= [(10\,000 - 8000)(10\,000) - 200\,000](1 - .34) + .34(\$6.5\text{M}/8) =$
\$13 344 250

(e) $Q = (FC + D)/(P - v) = (\$200\,000 + \$812\,500)/(\$10\,000 - \$8000) =$
$506.25 \approx 507$ units

(f)

Year	*Cash Flow*	
0	– \$ 9 299 610	IRR = 142.31%
1	\$13 344 250	NPV = \$39 427 988
2	\$13 344 250	discount rate = WACC = 12.82%
3	\$13 344 250	
4	\$13 344 250	
5	\$16 243 000	

Las Vegas hotels get that empty feeling

Herald Sun

Source: *Herald Sun* 1998, ‘Las Vegas hotels get that empty feeling’, 28 Dec., p. 78.

A room at Mirage Resorts’ $US1.6 billion ($A2.6 billion) Bellagio, the most expensive hotel ever built, can fetch less than $US99 some nights—about the same price as a three-star motel.

A glut of rooms in Las Vegas, the US gambling capital, is forcing casinos to slash rates to fill their hotels, putting more pressure on already-depressed profits.

Adding to hotel owners’ woes is the recession in Asia, which has bitten deep into earnings from big-spending high-rollers.

‘The fourth quarter will be one of the most difficult times the Las Vegas market has ever seen,’ said Bear Stearns analyst Jason Ader.

A three-year construction spree boosted the number of rooms in Las Vegas, the world’s biggest hotel market by more than 20 per cent to 110 000.

But the number of visitors has not kept pace—pulling down average occupancy to 87 per cent from 90 per cent.

‘Rates are coming down, down, down,’ said Anthony Curtis, whose *Las Vegas Advisor* newsletter tracks bargains for tourists. ‘It’s as good as it’s ever been for the consumer.’

The industry had hoped the October opening of Bellagio, a lavish 3000-room resort that boasts a world-class art collection with works by Renoir, would bring more visitors to Las Vegas—as happened in 1993 with the openings of three resorts.

The number of visitors rose 4.9 per cent in October. Bellagio’s results, though, appear to be falling short of forecasts based on its room rates and the impact on Mirage’s other properties.

Casino industry earnings are expected to rise only marginally next year with the openings of three more big resorts in Las Vegas that will add 11 900 rooms.

‘It’s going to be difficult for the market to absorb all that new supply,’ said Morgan Stanley Dean Witter analyst Mike Happel.

Bellagio was averaging $US188 a day for its rooms, above expectations, said Mirage chief financial officer Daniel Lee. The lower rates it sometimes offered were only for the last few rooms available, he said.

But the $US99 rate is being charged to independent customers, not those in tour groups.

So-called free and independent customers typically pay the highest rates—a sign that Bellagio's numbers were not so great, Mr Ader said.

Such customers 'are supposed to be your bread and butter', he said.

Circus Circus Enterprises, owner of the Luxor and Excalibur Las Vegas resorts, is expected to report a small rise in earnings.

The Las Vegas-based company's $US850 million Mandalay Bay resort, to open in March, will feature a Four Seasons hotel and a wave pool for surfing.

'There's still a risk that your earnings will be no better than your cost of capital and will be generally unrewarding,' said Donaldson, Lufkin & Jenrette analyst Brian Egger.

And competition has hurt its older casinos such as Circus Circus Las Vegas.

MGM Grand, controlled by billionaire Kirk Kerkorian, is expected to see a sharp fall in earnings as competition in Las Vegas has hurt its flagship MGM Grand hotel and casino on the strip, the city's busiest area.

Recession in Asia has also caused wealthy high-rollers from that region to gamble less at the MGM Grand.

Hilton Hotels, the largest casino company, is forecast to see a rise in earnings in the fourth quarter, but most of its growth will come from its chain of about 260 hotels, rather than gambling.

Hilton this month is spinning off its casinos into a new company, Park Place Entertainment, on expectations that investors will place a higher value on its hotels without the gambling business dragging down profits.

Harrah's Entertainment, the second-largest US casino company, should benefit from a strategy that has left it less dependent on Las Vegas.

Harrah's owns gambling halls in smaller markets such as North Kansas City and St Louis, Missouri, where they have faced little new competition.

Harrah's a

lso bought Showboat, owner of the popular Showboat casino in Atlantic City, New Jersey, in June.

The cost of capital

R. Maruca

Source: Maruca, R. F. 1996, 'The cost of capital', *Harvard Business Review,* Sept./Oct., vol. 74, no. 5, pp. 9–10 (illustrations not included).

The cost of capital

What's the best estimate?

Each year, in the United States alone, companies undertake more than $500 billion in capital spending. And basic financial logic holds that if a company doesn't earn at least its cost of capital, it will destroy shareholder value. But researchers from the University of Virginia's Darden Graduate School of Business Administration and from the University of Washington's Graduate School of Business say that although leading companies use the same general theoretical approaches to estimate the weighted average cost of capital (WACC), there is significant variation in practice when they calculate several key elements of the formula. That variation can lead to wide disparities in the resultant estimates of capital costs.

In 1995, the researchers conducted interviews with ten merger-and-acquisition groups at leading investment banks and with 27 well-regarded North American companies to learn how they estimated the cost of capital. The most nettlesome component of estimating the weighted average cost of capital, they found, is calculating the cost of equity capital. Although there are readily available yields in bond markets, no observable counterpart exists for equities.

Robert F. Bruner, the Robert F. Vandell Research Professor of Business Administration at the Darden School, conducted the study with Darden School colleagues Kenneth M. Eades, an associate professor, and Robert S. Harris, the C. Stewart Sheppard Professor of Business Administration. Robert C. Higgins, a professor of finance at the University of Washington's Graduate School of Business, completed the team. They discovered that practitioners in their study most often used the capital-asset pricing model to estimate such equity costs, but they also uncovered a good deal of variation in the way managers determined proxies for a risk-free rate of return, the beta of a company's stock, and an equity market-risk premium. In addition, they found that once a corporate WACC was determined, companies used many different methods—even internally—to deal with perceived differences in risk among investments.

The less available a good market proxy for the risk of a particular investment, the less likely was the use of explicit adjustments in hurdle rates to compensate for the risk.

The research team believes that, given the myriad different approaches, general managers considering their own organizations' methods should keep in mind that the cost of capital is at best an estimate and is measured with uncertainty. Professional judgment, Bruner and his colleagues note, lies in narrowing the range of uncertainty by using the kinds of theory-based approaches taken by companies that consistently earn more than their cost of capital. 'General managers should demand a sound theoretical rationale for the methods they use,' Bruner says, 'but they should also understand that a single theory can justify more than one approach.' Finally, Bruner notes, managers should encourage their finance departments to consider new approaches that come out of both business and academia.

The researchers say that their study is the first to document best practices for estimating WACC. Best practices, as they define them, are those methods most frequently used by the companies surveyed—organizations that have been identified by their peers as leading-edge companies in financial management. The study identified the following elements as representative of current best practice:

- Debt and equity weights are based on market-value mixes, not book-value mixes.
- The after-tax cost of debt is estimated from marginal pretax costs combined with marginal or statutory tax rates, as opposed to average costs and average tax rates.
- The capital-asset pricing model is by far the preferred model for estimating the cost of equity. None of the organizations surveyed reported modifying the model to adjust for its empirical shortcomings in explaining past returns.
- Betas are drawn, in large part, from published sources such as Bloomberg, Value Line, or Merrill Lynch. Best-practice organizations, the researchers found, tended not to estimate betas themselves. (They note that the near universal reliance on published sources suggests that internal estimation of betas yields little improvement over the betas provided by published sources.) Published sources generally estimate betas from past returns of a stock. Preferred betas are those that use a long interval of equity returns. The researchers say that if the statistical publishers disagree, best practice often requires making a judgment call and choosing a beta from among those sources.
- The risk-free rate is chosen to match the term of the cash flows that are being valued. For most capital projects and corporate acquisitions, managers used the yield to maturity on long-term U.S. government Treasury bonds as a guide.
- An equity market-risk premium is most often estimated using historical data. Even so, there are substantial variations in the actual figures used. Many of the corporations surveyed used a market premium of about 5%, whereas the financial organizations surveyed clustered around 7%. Despite theories calling for forward-looking estimates, almost none of the respondents used expectations data in attempting to estimate a market-risk premium.

'We hope that our study will stimulate further research to narrow the differences in how companies estimate the cost of capital,' Higgins says. 'Even for the most savvy organizations, the application of finance theory requires considerable judgment. It is part art, part science.' Harris concurs. 'In particular, as managers seek guidance from markets on how to value businesses, the guidance goes only so far. Managers must realize that cost-of-capital estimates are not precise numbers. Judgments about value thus rest on good business sense. We hope that practice will evolve to incorporate more financial-market information—in the form of expectations data, for instance—so that managers can enhance their ability to create value.'

Raising long-term capital and short-term finance

Topic
8

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Suggested answers

Readings

Introduction

At some point in the life of a business enterprise it will need to raise long-term capital. It will either borrow the money, called debt financing, or perhaps raise equity.capital, by selling shares. The business enterprise may even do both. Ross et al. (2000, p. 447) suggest that 'how a firm raises capital depends a great deal on the size of the firm, its life cycle stage, and its growth prospects'.

In this topic we will look at the ways in which businesses raise long-term capital. Long-term capital is that which will be employed by the business to essentially fund its long-term assets or investments. By long term, we mean that the capital being raised will be required by the business for more than one year, perhaps much more.

We will again concentrate on the business enterprises being companies rather than partnerships or sole proprietorships.

Initially, we will look at companies in the very early stages of their life, some of which will require venture capital. Many of these venture-capital companies will fail. Some will be successful and become solid small-to-medium enterprises. A few will become very successful and the nature of their product may require significant business growth. This last category of business will often become a public and listed company. We will look at the process of companies going public and inviting the public at large to buy (or subscribe to) those company's shares. We will look at alternative ways that companies can raise more share capital after the initial public offering.

We will also discuss the many sources of long-term debt capital available to companies (and to governments) and also the types of shorter term borrowings they may undertake. The financial products are many and the reasons for their use are many. You should familiarise yourself with all of them because you don't know quite when you or your organisation will be able to use them.

As you read through this topic try to relate the material to your own organisation. Try to determine why your organisation uses the long-term and short-term finance that it does, and the conditions it must satisfy to have access to those funds.

Objectives

At the completion of this topic you should be able to:

- explain the concepts of early-stage financing and venture capital;
- outline the basic procedure of a new issue and the advantages and disadvantages of public company issue;
- outline the difference between a primary issue and a secondary issue;
- describe the services of an underwriter;
- discuss the problems of underpricing an issue;
- explain the costs of issuing new securities;

- outline the process of a rights issue;
- explain the concept of dilution;
- describe the various sources of long-term debt and their nature;
- outline the concepts of debt ratings and different types of debentures;
- describe the various types of preference shares able to be issued by companies; and
- outline the various sources of short-term capital available to companies.

Learning resources

Textbook

Ross, S.A., Westerfield, R.W. & Jordan, B.D. 2000
Fundamentals of Corporate Finance
5th edn, Irwin McGraw-Hill, Boston, Chapter 15.

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Age, 16 Mar., p. 12.

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2nd Austn edn, Irwin, Sydney, pp. 502–10.

Ross, S. et al. 2001
'Debt ratings'
Fundamentals of Corporate Finance,
2nd Australian edn, Irwin, Sydney, pp. 510–13.

Ross, S. et al. 2001
'Rights'
Fundamentals of Corporate Finance
2nd Austn edn, Irwin, Sydney, pp. 553–61.

Ross, S. et al. 2001
'Short-term financing sources'
Fundamentals of Corporate Finance,
2nd Australian edn, Irwin, Sydney, pp. 482–7.

Ross, S. et al. 2001
'Some different types of debenture—and preference shares'
Fundamentals of Corporate Finance,
2nd Australian edn, Irwin, Sydney, pp. 513–22.

Ross, S. et al. 2001
'The public issue'
Fundamentals of Corporate Finance
2nd Austn edn, Irwin, Sydney, pp. 536–41.

Walters, K. 1999
'A world of financing options'
Business Review Weekly,
1 Mar. pp. 77–84.

Key concepts

The following key concepts are introduced and developed in this topic:

- venture capital;
- initial public offer;
- private placement;
- rights issue;
- tombstone advertisement;
- underwriter;
- underpricing;
- flotation costs;
- dilution;
- private placement;
- preference shares;
- unsecured notes;
- convertible notes;
- leases;
- Eurobonds;
- overdraft;
- term loans;
- bills of exchange;
- promissory notes;
- inventory loans;
- factoring;
- letters of credit;
- short-term Eurocurrency;
- mortgage securitisation; and
- debentures.

Early-stage financing

Many ideas for new products and services come out of the minds of entrepreneurs. Turning these ideas into businesses may be very difficult and they certainly may be very difficult to fund. This is where the venture-capital market has a place in our economy. Venture capital is basically capital made available to high-risk, young, and often high-growth and potentially very high-return ventures.

Reading

Please read the introduction to Chapter 15 and 'The financing life cycle of a firm: Early-stage financing and venture capital' in Ross et al. 2000, pp. 447–50. You should note:

- **the various stages at which venture capital may be offered (pp. 448–9);**
- **the very strong demands made by venture capitalists including receiving a large percentage of the equity of the company, the voting rights and seats on the board of directors (pp. 448–9); and**
- **some key attributes of the venture capitalist (p. 449).**

Development capital grows

Funds under management for development capital in Australia have grown to more than $1.4 billion and now account for 46% of equity funding for fledgling companies. An inaugural survey of the development-capital sector by Arthur Andersen has revealed that $918 million of those funds are managed by 17 of the 31 members of the Australian Development Capital Association (ADCAL).

The survey is the first to give an insight into the performance of companies receiving development capital by providing aggregate information on their trading and financial operations. Most of the funding has been allocated to companies that have evolved past the venture-capital and seed-capital stage and want to expand or restructure their business with a view to a public listing.

Development-capital funds from public companies were provided by Advent Management Group, Carrington Equity Ltd, Continental Venture Capital Ltd and Development Capital of Australia Ltd.

Funding is often in the form of equity, with investors contributing to management decision-making and with an average investment period of three to five years. The chairman of ADCAL, Mr Joseph Skrzynski, said yesterday that the survey provided the first snapshot of the progress of the development-capital sector. 'It is now attracting greater attention from the government because of the job-creation aspects,' he said. 'Half of those employed in the private sector are employed by unlisted companies which have often found it difficult to raise capital from traditional sources.'

Source: Petty et al. 1996, p. 956.

Reading

Please read Lewis 1999, 'Start me up: Where the money is' regarding finding venture capital sources using the Web.

Selling shares to the public

There are many rules and regulations regarding the initial selling of shares to the public (also called the initial public offering). The following reading illustrates the basics.

Reading

Please read Ross et al. 2001, 'The public issue'. You should note particularly:

- **the basic procedure for a new issue;**
- **the expression 'flotation', used to describe the offering of securities to the public;**
- **the expression 'primary issue', used to describe the offering of securities to the public for the first time—note that this can also be called the initial public offering;**
- **the advantages of a public company listing;**
- **the disadvantages of a public company listing;**
- **the requirements of a minimum of $1 000 000 of issued capital and a minimum of 500 shareholders for an industrial company that wants to be listed with the Australian Stock Exchange;**
- **the two most popular ways of raising additional share capital being private placements and rights issues;**
- **private placements, which are shares (or debt instruments) sold directly to individuals or companies;**
- **rights issues, which are issues of new shares (at a price) to existing shareholders in direct proportion to the number of shares those shareholders currently hold (we will discuss rights and the value of rights in more detail later on in this topic); and**
- **tombstone advertisements, used by investment firms to show that the issue has been fully subscribed.**

Even though companies are able to have a new issue of shares to the public at large after the initial public offering, Australian companies have tended towards either a rights issue or a private placement as a way of raising extra equity capital. Rights issues allow the existing shareholders the 'right' to buy more shares in the company in direct proportion to the number of shares they already hold. Private placements, or private issues, are an issue of shares to certain investors, often life-insurance companies or investment companies (but they can be to anyone whom the company chooses).

Rights issues are made in two ways. The rights issue may be *renounceable* or *non-renounceable*. A renounceable rights issue allows existing shareholders to either take up their right to buy more shares or to sell (renounce) their entitlement to some other party. A non-renounceable rights issue allows existing shareholders to either take up their right to buy more shares or those shareholders can let the right to buy additional shares lapse. Clearly, the renounceable rights issue would be the one preferred by existing shareholders because it may have some value. The value is related to the difference between the subscription price for the new shares and the current market price of the existing shares. We will discuss this in more detail later in this topic. You should also remember that rights issues must be accompanied by a prospectus.

Private placements do not require a prospectus and from the viewpoint of the issuing company there are four major advantages:

- The required equity capital can be raised more quickly than with a rights issue.
- The issue costs are likely to be lower than with the rights issue because a company, or its investment bank, is dealing with fewer investors.
- The board of directors may be able to strengthen its control by placing the shares with friendly investors.
- It is likely that the company is able to obtain a higher price for the shares through a private placement than through a rights issue.

Existing shareholders aren't always happy with a private placement for two basic reasons. The first is that shareholders will obviously suffer a dilution of their percentage ownership. The second is that, because the shares are issued at a discount to the existing market price through the private placement, the price of the existing shares may fall slightly towards that discounted price.

Probably because of the two major objections outlined above, the listing requirements of the Australian Stock Exchange limit private placements to 10% of the issued capital (number of shares issued) of the company in any 12-month period.

Exercise 8.1

Find a recent copy of the *Australian Financial Review* and locate a tombstone advertisement. Find out how much money was raised and which investment firms helped raise the money. Was it an initial public offer, a rights issue or a private placement? Are you surprised at the amount of money raised?

Underwriters

Underwriters are investment firms that help sell and help guarantee the success of the capital raising. This capital raising may be undertaken by one underwriter or by a group of underwriters. Underwriters can be involved with the initial public offering or with a rights issue.

Underwriting and sub-underwriting

Underwriting is defined as a guarantee that funds will be made available to a company at a specific time and on agreed terms and conditions. The underwriter is the guarantor of the availability of the funds through share sales. The underwriter may choose to reduce some of the exposure to the issue through a sub-underwriting panel. It is common to seek new large institutional shareholders for the company by including these institutions on the sub-underwriting panel. As a sub-underwriter the institution will receive a fee for an obligation to take up some of the shortfall. Usually the underwriter offers general sub-underwriting participation, which means that in the event of a shortfall, say 10 per cent, the sub-underwriter is responsible for subscribing to a percentage (10%) of the amount of shares underwritten. A less prevalent alternative in share flotations and rights issues (but not in debt issues) is an offer of specific sub-underwriting in a set parcel of shares.

Where the funds are guaranteed the situation is called a *firm* underwriting. A *standby* underwriting will generally arise in takeover situations, where the bidding company has insufficient cash if the bid is totally successful or where the bidding company wants to provide cash (from the underwriter) as an alternative to a share bid. A *best efforts* underwriting arrangement is where the underwriter is bound to use 'best efforts' to sell the securities at the agreed offering price. Beyond this, the underwriter does not guarantee any particular amount of money to the issuer company.

Underwriting fees

Typically the underwriter's fee is expressed as a percentage of the capital to be raised and takes into account the degree of risk involved. Factors affecting risk will include the relative size of the issue and issue price, market conditions generally and the likely attitude of the market towards the shares and the time period from when the underwriter goes firm to the opening of the issue. In addition to the risk component in the underwriting fee, allowance is made for brokerage (a selling fee) and management of the issue. On occasions a separate management fee or a prospectus preparation fee is charged by the underwriter, particularly where additional tasks are undertaken. Out of the underwriting fee, the underwriter will pass on a commission to their sub-underwriters. This commission will reflect the risk involved in the issue, though it should be noted that the underwriter's risk (and hence reward) is usually greater than that of the sub-underwriters, since the underwriter often guarantees the issue prior to seeking sub-underwriting support.

In recent times, fees for initial equity issues of industrial companies including brokerage have ranged from three per cent to five per cent. This cost can be avoided if the issue is not underwritten. A company may decide that an underwriter is not necessary as the offer is sufficiently attractive so that there is little chance of a shortfall. The Telstra share offer was not underwritten.

Source: Ross et al. 2001, pp. 541–2.

Note the approximate underwriting fees which can certainly amount to a great deal of money. Note also the types of underwriting—firm, standby and best efforts.

Initial public offerings and underpricing

One major obligation of an underwriter is to help determine the selling price of the new shares on offer to the public. Determining the appropriate selling price is arguably one of the most difficult things to do when going public. If the issue price is set too high, this will result in an under-subscription of the issue. If the issue price is too low then there will be an over-subscription and the issuing company will have lost out on the cash for the equity capital that rightfully belonged to it.

Some new-issue Internet stocks listed on the Nasdaq Exchange in New York have been breathtaking. For instance, theglobe.com was floated on the Nasdaq Exchange in late 1998 for US$9 and soared to US$97 on the opening day. Service provider Yahoo, which was floated in 1995 for US$13, in early 1999 touched US$400.

Reading

Please read 'IPOs and underpricing' (Section 15.5) in Ross et al. 2000, pp. 455–61. You should note:

- **the magnitude of some of the initial public offerings, the biggest in the world so far being Nippon Telephone and Telegraph raising around US$37 billion (p. 457);**
- **the average initial returns on the initial public offerings in countries around the world (in the article by Jay Ritter on p. 456);**
- **underpricing in newly listed US securities averaged around 15.7% during 1990–1998 (p. 458);**
- **underpricing in newly listed US securities averaged around 15.7 per cent during 1960–1998 (p. 458); and**
- **the possible reasons for underpricing are the lack of sales history for the new company, the underwriters helping investors avoid the 'winners curse' and perhaps even the conservatism of investment banks who would rather have happy investors than unhappy ones (pp. 460–1).**

Exercise 8.2

Attempt 'Concepts review and critical thinking questions' 5, 6, 7, 8 and 10 (pp. 480–2) and 'Questions and problems' 4 (pp. 482–3) in Ross et al. 2000.

New equity sales and the value of the firm

It would seem reasonable to believe that companies would decide to sell shares to raise equity capital because those companies have discovered new, positive NPV projects. One would also think that because such projects have been found that the price of the shares in that company should go up. This has not tended to be the case.

Reading

Please read 'New equity sales and the value of the firm' (Section 15.6) in Ross et al. 2000, pp. 461–2. You should note the following points:

- **the possible reasons that share price has not increased with new equity issues are three. The perception that perhaps management issues new equity when the share price may be 'high'; perhaps the company has too much debt already or too little liquidity; and**

  perhaps because shareholders perceive the issue costs will erode much of the possible gain from the positive NPV project (pp. 461–2); and
- **the drop in the share price following the announcement of a new issue is typically in the order of about 3% (p. 462).**

The costs of issuing new securities

The cost of raising money from the public is not cheap. Apart from the underwriting commissions discussed briefly above, there are other direct expenses, indirect expenses, abnormal expenses and the possibility of underpricing. These expenses are called flotation costs.

Reading

Please read 'The costs of issuing securities' (Section 15.7) in Ross et al. 2000, pp. 462–6. You should note the following points:

- **each of the costs of issuing securities (p. 462). (Note that the expression 'spread' is generally called the 'underwriter's commission' in Australia; note also that the 'Green Shoe option' is not called that in Australia but certainly underwriters may be able to sell additional shares over and above the amount of capital that was intended to be raised—this amount is stated in the prospectus);**
- **the average underwriting costs for the initial public offerings are about 7.31% and other direct expenses are about 3.69% in the US (pp. 464–5); and**
- **the costs of issuing shares are much higher than the costs of issuing long-term debt (p. 465).**

Exercise 8.3

Attempt 'Chapter review and self-test problem' 15.1 (p. 479), 'Concepts review and critical thinking question' 2 (p. 479) and 'Questions and problems' 5, 6 and 7 (p. 480) in Ross et al. 2000.

Rights

We have previously discussed that a rights issue is a further equity-capital-raising method used by the public and listed company after the initial public offer. We also discussed that rights issues allow the existing shareholders the 'right' to buy more shares in the company in direct proportion to the number of shares they already hold. You can read Section 15.8 in Ross et al. (2000, pp. 466–74) to get an understanding of the situation regarding rights in the US if you want to. However, Reading 8.3 has been provided so that you can get an understanding of rights issues in Australia. The Australian situation is the one that is examinable at the end of this unit.

Reading

Please read Ross et al. 2001, 'Rights'. You should note the following points:

- rights issues allow the existing shareholders to maintain their proportional ownership;
- the three options facing shareholders who might have a rights offer made available to them are to exercise their right and buy some more shares, or sell the rights certificate, or let the rights offer expire;
- in the section headed 'Number of rights attaching to each share', note that one right actually carries the right to buy one share. So, if a company wanted to raise $5 000 000 as the example suggests, it would issue 500 000 rights with a subscription price per share of $10;
- the value of a right is shown in Table 17.9 and 17.10;
- note concepts of 'ex rights' and 'cum rights';
- shareholders do not lose or win by exercising (subscribing for the new shares) or selling the rights;
- the costs of rights offerings (even when underwritten) is less than new equity issues; and
- rights offerings are much used in Australia.

Exercise 8.4

Rights offerings

1. The Lacteron Company Ltd currently has 40 million shares outstanding. The shares sell for $5 per share. To raise $30 million for a new particle accelerator, the firm is considering a rights offering at $2 per share. What is the value of a right in this case? The ex-rights price?
2. Pennywise Industries Ltd is planning to raise fresh equity capital by selling a large new issue of ordinary shares. Pennywise is currently a publicly traded corporation, and it is trying to choose between an underwritten cash offer and a rights offering (not underwritten) to current shareholders. Which would incur less costs?
3. New Jive Co. Ltd is proposing a rights offering. Presently there are 1 000 000 outstanding shares at $10.20 each. There will be 400 000 new shares issued at $8.
   (a) What is the value of a right?
   (b) What is the ex-rights price of a share?
   (c) What is the new market value of the company?
   (d) Why might a company have a rights offering rather than a cash ordinary share offering?
4. Covariance Co. Ltd is a manufacturer of beta-blockers (consumers are just sick and tired of those pesky betas). Management has concluded that additional equity financing is required to increase production capacity and that these funds are best attained through a rights offering. It has correctly concluded that as a result of the

rights offering, share price will fall from $10 to $9 ($10 is the cum-rights price; $9 is the ex-rights price). The company was seeking $5 million in additional funds with a per share subscription price equal to $5.

How many shares were there before the offering? (Assume that the increment to the market value of the equity equals the gross proceeds from the offering.)

Source: Ross et al. 2001, pp. 567–70.

Dilution

Dilution refers to the loss in existing shareholders' value in three ways. The loss in percentage ownership, the loss in market value and the loss in book value or earnings per share. Dilution can occur as a result of any new equity.

Reading

Please read 'Dilution' (Section 15.9) in Ross et al. 2000, pp. 474–6. You should note:

- **new public offerings of shares may dilute the proportional ownership of existing shareholders while rights issues may not (pp. 474–5);**
- **the difference between market values and book values (pp. 475–6);**
- **how a new issue of shares can affect earnings per share, the proportionate number of shares held by old shareholders, the market price of the shares and the book value of the shares (p. 475); and**
- **negative NPV projects are the true cause of book value dilution. Positive NPV projects will actually lead to an increase in the market value (pp. 475–6 and Table 15.11).**

Exercise 8.5

Attempt 'Questions and problems' 8, 9 and 10 in Ross et al. 2000, p. 483.

Long-term debt

So far in this topic we have dealt with companies issuing long-term equity capital. Most companies also want to raise long-term debt capital (or borrowings) to help with the funding of long-term investment projects. There is no fixed definition of what constitutes long-term debt but we will assume that long-term debt is debt which need not be repaid for up to 12 months. You will see that there are many different types of long-term debt products (also called securities) available in the Australian capital market. We will discuss the most common.

Reading

Please read Ross et al. 2001, 'Corporate long-term debt'. You should note particularly the following points:

- **there are basic differences between debt and equity. These differences are that debt providers are not owners, that interest payments on the debt are tax deductible to the borrower and that unpaid debt is a liability and the lenders have a legal claim on the assets of the business;**
- **note the different characteristics of debt including short term or long term, fixed or floating, secured or unsecured, domestic or foreign;**
- **a negative pledge arrangement on unsecured loans restricting the borrower's ability to borrow further;**
- **take note of the differences between debentures, secured notes and unsecured notes;**
- **convertible notes are unsecured notes convertible into shares at the option of the noteholder at nominated points in time;**
- **fixed (deposit) loans are also called fully drawn advances or term loans and are normally for periods up to five years but can be for as little as 90 days;**
- **mortgages rely on real property as the basis for the loan;**
- **Eurobonds are borrowings in Australian dollars but the money is raised overseas;**
- **Eurocurrency floating rate notes are funds borrowed by an Australian bank from overseas and then lent to the Australian borrower on a floating rate basis;**
- **the different sorts of leasing (or renting) are direct leases, leveraged leases and cross border leases;**
- **the nature of project finance involves a (large) project, a sponsoring company (or companies) and a lender (or lenders) who have a claim on the assets and the cash flows of the project after the completion of the project;**
- **transferable loan certificates allow the original lender to sell the loan after it has been arranged;**
- **note the nature of derivative debt products such as interest rate swaps and forward rate agreements;**
- **companies can issue hybrid securities which may initially be debt-type instruments on which interest is payable but which at some future point in time turn into equity-type instruments allowing a real ownership interest. You will have noted that a convertible note is such a hybrid security; and**
- **a debenture trust deed is a written agreement between the company and the lender (or lenders). Included in the deed are items such as the terms of the issue, the security used to protect the lender, the repayment terms (including the sinking fund), the ability to 'call' or cash in some or all of the debt and the protective covenants that apply to the debenture issue.**

As you can see, the nature of long-term debt is not really straightforward. To add more jargon to what you have learned already we should again raise the term 'bonds'. The term 'bonds' (which is commonly used in the USA) has in Australia really been used to describe government debt raisings and has only over the last seven years or so gained prominence in Australian corporations. Debentures and secured or unsecured notes are examples of 'bonds'. Like debentures or notes, they are long-term debt instruments which promise to pay interest semi-annually or annually. The term 'bonds' has generally been used in favour of the terms 'debentures' or 'notes' by very large corporations and governments, but certainly the terms 'debentures' and 'unsecured notes' are still often used.

Debt ratings

From time to time you will hear of rating agencies rating the quality of the debt securities of Australian companies and government or semi-government authorities. The two major rating agencies in Australia are Moody's and Standard & Poor's.

Reading

Please read Ross et al. 2001, 'Debt ratings'. You should note:

- **ratings can be used to assess the creditworthiness of the borrower and that creditworthiness is reflected in the interest rate required;**
- **the rating codes used to reflect creditworthiness; and**
- **the use of the term 'junk' to reflect a very low rated debt security.**

Excessive debt submerges a corporate dynasty

Besides its conventional use of providing funds to purchase assets and underwrite the operations of a firm, debt can be used to finance management buyouts and takeovers. Regardless of the purpose, if a firm borrows and is to remain solvent, it is essential that the funds are used to create value by generating returns that exceed the cost of the debt. This is a fundamental requirement for all corporate borrowing, and any firm that departs from this is destined to become submerged in debt and have its solvency placed under threat. It was a neglect of this basic principle that led to the demise of Warwick Fairfax in his ill-fated takeover of the John Fairfax group.

The John Fairfax group was one of the oldest companies in Australia. In 1987 the company was in a strong financial position, with highly valued assets which included the *Sydney Morning Herald* and the Melbourne-based newspaper *The Age*. The company had been a family company whose ownership had spread outside the family core by the public issue of equity. Warwick Fairfax had a vision to revive the Fairfax dynasty and have the company return to the fold and continue as a family company under his control. His plan was to finance his takeover with debt and to privatise the company. His strategy was essentially a leveraged buyout to be paid for over time by the cash flow from the earning of the Group's assets.

The problems for Warwick Fairfax began when he paid too high a price for the company in 1987. He borrowed heavily to finance his takeover and by 1988 owed his bankers $1.7 billion. To reduce his bank debt, Fairfax raised $450 million in junk bonds, but this only worsened the company's problems. Fairfax refused to face the reality of the situation when he rejected the opportunity to sell *The Age* and half of the

Business Review Weekly to Robert Maxwell in 1988 for $850 million. This presented Fairfax with an opportunity to substantially reduce his debt burden and improve his chances of survival. Fairfax's refusal to accept this offer was what ultimately led to his downfall. By rejecting Maxwell's offer, Fairfax was starved of cash and was unable to refinance the Group's operations. Because of the cash crisis created by mounting debt, the Group experienced financial distress and was unable to fulfil its debt obligations. This placed the company under continual attack from its bondholders. Numerous attempts were made to reconstruct the company, with millions of dollars being spent on retaining corporate advisers, lawyers and financiers. All these efforts to save the company failed, and the John Fairfax Group was finally placed into voluntary liquidation; with this, Warwick Fairfax's dream of presiding over the dynasty that began over 150 years earlier died.

Source: Gitman et al. 1998, p. 593.

Some different types of debenture

In this section we will discuss a few of the more 'exotic' debentures. Remember that the expression 'bonds' can be used in place of debentures.

Reading

Please read Part A of Ross et al. 2001, 'Some different types of debenture—and preference shares'. You should note:

- **the nature of the zero coupon debenture where no interest is actually paid until maturity; and**
- **the nature of the floating rate debenture which allows for a movement in interest rates and therefore in interest payments.**

Preference shares (stock)

Preference shares have been issued by some very notable Australian companies such as Coles Myer, ANZ Banking Group, News Corporation and Coca-Cola Amatil. Such shares offer the shareholder preferential treatment in basically two aspects. Firstly, preference shareholders are given dividend priority (meaning that they are entitled to their dividend before ordinary shareholders receive their dividend) and, secondly, in the event of a company being liquidated, the preference shareholders rank ahead of the ordinary shareholders as to the return of the capital. The following section outlines some features that preference shares may have.

Reading

Please read Part B of Ross et al. 2001, 'Some different types of debenture—and preference shares'. You should note the following points:

- **the cash dividend is described in dollars (or cents) per share and the dividend yield is a function of the share price;**
- **note the nature of cumulative redeemable participating preference shares;**

- **interest paid on tax-deductible debt tends to be higher than the non-tax-deductible preference share dividend rate;**
- **preference shareholders cannot receive franked dividends;**
- **preference shares are treated by the Reserve Bank as part of the equity capital base of banks in determining their capital adequacy ratios;**
- **preference shareholders cannot force the company to pay them dividends; and**
- **preference shareholders are often non-voting shareholders.**

Exercise 8.6

1. **Rank the following long-term debt arrangements in terms of the level of interest rate you would expect a company to have to pay:**
   (a) **mortgage loan by a hire purchase company secured by a charge on land;**
   (b) **debentures secured by a floating charge;**
   (c) **unsecured notes;**
   (d) **convertible notes;**
   (e) **directors' loans to the company;**
   (f) **bank overdraft; and**
   (g) **unsecured bank fixed loan.**

Provide reasons for your ranking.

2. **Which has a higher yield, preference shares or corporate debentures? Why is there a difference? Who are the main investors in preference shares? Why?**
3. **(a) What are the main differences between corporate debt and equity?**
   (b) **Why do some clever firms try to issue equity in the guise of debt?**
   (c) **Why might preference shares be called an 'equity debenture'?**
4. **Explain what is meant by a 10% $1 par cumulative, redeemable, non-participating preference share.**

Source: Ross et al. 2001, pp. 531–2.

Short-term financing sources

In addition to companies using long-term debt and equity capital (or hybrids such as convertible notes and preference shares), most companies also need and use short-term funds. Short-term finance (also called working capital finance) is that which is essentially needed to fund short-term cash needs. Again, there is no universal definition of short-term finance but we will regard it as finance (cash) that must be repaid within 12 months.

Short-term financing—A business perspective

Tony Jacobson—Vice President of Finance Patch Products

From 1991–1995, Patch Products' sales increased by a multiple of 10. Our business—games and puzzles—is very seasonal; from September to December we bill 65 per cent of total sales. Although our puzzle lines (40 percent of revenues) sell steadily during the year, we sell most games in the fourth quarter. Such rapid growth and seasonality makes working capital management absolutely critical.

In the game business, it takes a long time to go from cash to inventories to receivables back to cash (the operating cycle). A key part of my job is financing the inventory buildup during the year and managing receivables later. For example, we need to produce about 500 000 units of TriBond, one of the top selling games in the United States and Canada, by the fourth quarter. Fortunately, puzzles have a faster operating cycle; they turn about 10 times a year, compared to TriBond's once a year, for a company average of four times a year.

Our business requires high current asset and liability levels, rather than fixed assets. Because our cash flow goes from a gush in January to a trickle in July and August, we use short-term secured bank lines to fund the inventory buildup. Currently, management is actively seeking spring products to balance out this seasonal cash flow pattern.

To strengthen our cash flow, we stretch payables rather than take cash discounts. We get 60-day payment terms from most major vendors, providing a larger window to plan our payables. We also have two secured bank lines of credit. The working capital line is secured by receivables and inventory, with the amount based on the percentage of acceptable receivables and inventories. Our inventory is pretty marketable, so the bank gives us a higher percentage than another company might get. The second line is for capital equipment and is collateralised by the equipment purchases. We can borrow up to 80 per cent of its acquisition value.

Overall, Patch follows an aggressive financing strategy, making heavy use of short-term financing. Although this is riskier, it maximises profitability. When interest rates dropped, however, we used longer-term debt to cover some fixed asset acquisitions and maintain short-term financing availability to fund growth.

Tony Jacobson joined Patch Products as Vice President of Finance in 1995. He received a B.S. in Accounting and Finance from the University of Wisconsin, Platteville, and an M.B.A. from the University of Wisconsin, Whitewater.

Source: Gitman 1997, p. 685.

The next section in this topic works through a list of various commonly used sources of short-term finance.

Reading

Please read Ross et al. 2001, 'Short-term financing sources'. You should note the following points in particular:

- **a bank overdraft is an arrangement with a bank that allows the customer to have a negative balance, up to an agreed limit;**
- **a short-term loan (sometimes also referred to as a fully drawn advance) is able to be borrowed for a fixed period;**

- bills of exchange (also referred to as commercial bills) are like post-dated cheques used by a borrower that should be honoured by the borrower at maturity. Learn the parties to the bills of exchange;
- bank bills, although short term, may be 'rolled' (extended) for periods up to five years;
- note how to calculate the 'yield' or real interest rate;
- promissory notes are 'promises' in writing to pay a certain sum of money at some future point in time by one party to another. Note also that promissory notes are unsecured;
- inventory loans are loans which use a borrower's inventory as security (or collateral) for a loan;
- letters of credit are unconditional, irrevocable undertakings by a bank to repay the interest and principal on a loan if the borrower defaults;
- short-term Eurocurrency loans, if used, are normally used by large, very creditworthy borrowers;
- note the discussion of factoring or selling accounts receivable (debtors) to a financial institution (also known as a factor) in exchange for cash (p. 487). Factoring can be 'recourse' or 'non-recourse'. Recourse means that the factor is able to recover the debt in the event of the debtor failing to pay their debt. Non-recourse means that the factor is prepared to accept the default. Factoring may also involve 'notification', meaning that the debtor is notified that their debt has been sold to a factor. In cases of notification it is common that the debtor actually sends their amount owing to the factor directly, not to the company which the goods or services were bought from originally; and

Exercise 8.7

1. Consider return, risk, maturity, liquidity and marketability of each of the following investments and classify each as to whether it would be rated in relative terms as low, medium or high on the characteristics:

   (a) shares traded on the stock exchange;

   (b) treasury notes;

   (c) preference shares;

   (d) listed corporate debentures;

   (e) non-listed corporate debentures; and

   (f) real estate in an exclusive suburb.

2. Your firm has an average collection period of 60 days. Current practice is to factor all receivables immediately at a 4% discount. What is the effective cost of borrowing in this case? Assume that default is extremely unlikely.

3. **Short Company Ltd requires funds to meet a short-term deficit which it has identified in its cash budget. It has determined that it will require $480 000 for three or four months. It has approached three banks and obtained the following quotations for bills arranged with a minimum face value of $100 000.**

	Term	Yield	Term	Yield
Sun Bank	90 days	14.36%	180 days	14.30%
Cor Bank	90 days	14.40%	180 days	14.00%
Met Bank	90 days	14.35%	180 days	14.10%

How much would Short receive if it borrowed using the bill facilities provided by the banks? What do the banks think is going to happen to interest rates? Which borrowing arrangement would you advise Short to use?

4. **Define the role (if any) of each of the following in relation to a bill of exchange:**

   (a) an acceptor;

   (b) a payee;

   (c) a drawer;

   (d) an endorser; and

   (e) a bearer.

5. **Define the role (if any) of each of the following in relation to a promissory note:**

   (a) an acceptor;

   (b) a payee;

   (c) a drawer;

   (d) an endorser; and

   (e) a bearer.

Source: Ross et al. 2001, pp. 493–7.

Exercise 8.8

Find out what sources of short-term finance your organisation uses. Find out why it uses those sources. Are you satisfied with the reasoning as to why those particular sources are used?

Reading

Please read Walters 1999, 'A world of financing options'. Please note that the raising of long-term and short-term capital often involves using a combination of financial products. Detailed note-taking is not required.

Summary

This topic has been devoted to companies raising long-term capital and short-term finance. Long-term capital we suggested was capital required for 12 months or more, while short-term capital was that required for less than 12 months. Even though this is not a universally accepted definition it is commonly accepted.

The two basic forms of long-term capital discussed were equity and debt. In this topic we looked at how the cost of issuing equity was quite large and that there are direct costs (like underwriting fees) in going public. However, there are also indirect costs like the subscription prices for shares being substantially less than the trading prices of those shares when the company is listed.

We discussed how companies commonly raise additional equity capital if needed, either by a rights issue or a private placement.

The discussion on long-term debt introduced many financial products which could be used by public companies. We also discussed hybrids, or those products which have a debt and equity feel about them such as convertible notes and preference shares.

We ended by discussing short-term finance and again raised various products that companies can and do use to help them finance their businesses.

You are part of the way down the road to understanding the raising of funds. In the next topic you will go the rest of the way. In Topic 9, we discuss the relationship between the two major sources of funds for companies—debt and equity, and we discuss whether there is a 'better' mix of debt and equity for companies. By 'better' we mean whether the mix of debt and equity can be manipulated so as to maximise the company's share price.

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Suggested answers

Topic
8

Exercises

Exercise 8.2

Answers to 'Concepts review and critical thinking questions'

5. It is clear that the stock was sold too cheaply, so Netscape had reason to be unhappy.

6. No, but, in fairness, pricing the stock in such a situation is extremely difficult.

7. It's an important factor. Only 5 million of the shares were underpriced. The other 33 million were, in effect, priced completely correctly.

8. The evidence suggests that a non-underwritten rights offering might be substantially cheaper than a cash offer. However, such offerings are rare and there may be hidden costs or other factors not yet identified or well understood by researchers.

10. (a) The price will probably go up because IPOs are generally underpriced. This is especially true for smaller issues such as this one.

    (b) It is probably safe to assume that they are having trouble moving the issue, and it is likely that the issue is not substantially underpriced.

Answers to 'Questions and problems'

4. If you receive 1000 shares of each, the profit is 1000($7) – 1000($4) = $3000.
   Expected profit = 500($7) – 1000($4) = – $500. This is an example of the winner's curse.

Exercise 8.3

2. From the previous question, economies of scale are part of the answer. Beyond this, debt issues are simply easier and less risky to sell from an investment bank's perspective. The two main reasons are that very large amounts of debt securities can be sold to a relatively small number of buyers, particularly large institutional buyers such as pension funds and insurance companies, and debt securities are much easier to price.

5. $X(1-.08) = \$12M$; $X = \$13\ 043\ 478.26$ required total proceeds from sale.
Number of shares offered = $13 043 478.26 / $23 = 567 108.

6. $X(1-.08) = \$12.2M$; $X = \$13\ 260\ 869.57$ required total proceeds from sale.
Number of shares offered = $13 260 869.57 / $23 = 576 560.

7. net amounts raised = (1.5M shares)($14) – $450 000 = $20.55M
total direct costs = $300 000 + ($15 – $14)(1.5M shares) = $1.8M
total indirect costs = $150 000 + ($17 – $15)(1.5M shares) = $3.15M
total costs = $1.8M + $3.15M = $4.95M
flotation cost percentage = $4.95M / $20.55M = 24.09%

Exercise 8.4

1. To raise $30 million at $2 per share, $30 million / $2 = 15 million shares will have to be sold. Before the offering, the firm is worth 40 million × $5 = $200 million. The issue is to raise $30 million so that and there will be 55 million shares outstanding. The value of an ex rights share will therefore be $230 / 55 = $4.18. The value of a right is thus:

$$40 / 15 \times (5 - 4.18) = \$2.18$$

or

$$40/15\left(\frac{5-2}{40/15+1}\right) = \$2.18$$

2. The evidence suggests that the costs associated with non-underwritten rights offerings are substantially less than those of cash offers.

3. (a) $V_R = N\left(\frac{M-S}{N+1}\right) = 10\left(\frac{10.20-8}{11}\right) = 2$
(b) $V_{XR} = \left[10(10.20) + \$8\right]/11 = \$10$
or 10.20 – .20 = $10

(c) $V_{New} = 4.4\ \text{million}(10) = 44\ \text{million}$

(d) A rights offering costs less, protects the proportionate interests of existing shareholders and protects against underpricing.

4. $9 = \left[10(N) + 5\right]/(N+1)$ $V_R = 10 - 9 = 1$
$N = 4$; so 4 shares are needed to buy 1 right.

5 000 000 / 5 = 1 000 000 shares to be sold.
4(1 000 000) = 8 000 000 shares outstanding before the offering.

Exercise 8.5

8. Number of rights needed = 100 000 old shares / 20 000 new shares = 5 rights per new share.

(a) $P_x = [5(\$75) + \$75] / 6 = \$75.00$; no change.

(b) $P_x = [5(\$75) + \$50] / 6 = \$70.83$; price drops by $4.17 per share.

(c) $P_x = [5(\$75) + \$25] / 6 = \$66.67$; price drops by $8.33 per share.

9. (a) number of shares after offering = 10M + \$63M / \$30 = 12.1M
new book value per share = [10M(\$60) + 2.1M(\$30)] / 12.1M = \$54.79
$\text{EPS}_0 = NI_0/\text{shares}_0$ = \$20M / 10M shares = \$2 per share; $(P/E)_0$ = \$30 / \$2 = 15
$\text{EPS}_1 = NI_1 / \text{shares}_1$ = \$21M / 12.1M shares = \$1.75 per share;
$P_1 = (P/E)_0 (\text{EPS}_1)$ = 15(\$1.735) = \$26.03
Old market-to-book = \$30 / \$60 = 0.5; new market-to-book =
\$26.03 / \$54.79 = 0.4751

Accounting dilution has occurred because new shares were issued when the market-to-book ratio was less than one; market value dilution has occurred because the firm financed a negative NPV project: NPV = –\$63M + [12.1M(\$26.03) – 10M(\$30)]
= –\$48.037M.

(b) For the price to remain unchanged when the P/E ratio is constant, *EPS* must remain constant. NI_1 = (12.1M shares)(\$2 per share) = \$24.2M.

10. $\text{ROE}_0 = NI_0 / TE_0$ = \$525 000 / \$3 000 000 = .1750
$NI_1 = (\text{ROE}_0)(TE_1)$ = .1750(\$3 000 000 + \$525 000) = \$616 875.00
EPS_0 = \$525 000 / 10 000 shares = \$52.50; number of new shares = \$525 000/\$80 = 6563
EPS_1 = \$616 875 / 16 563 shares = \$37.2442; $(P/E)_0$ = \$80 / \$52.50 = 1.5238;
P_1 = 1.5238(\$37.2442) = \$56.753
$(P/E)_1$ = \$56.753 / 37.2442 = 1.5238
$\text{BVPS}_0 = TE_0 / \text{shares}_0$ = \$3 000 000 / 10 000 shares = \$300.00 per share;
$\text{BVPS}_1 = TE_1 / \text{shares}_1$ = (\$3 000 000 + \$525 000) / 16 563 shares = \$212.82 per share
Market-to-book_0 = \$80 / \$300 = 0.27; market-to-book_1
= \$56.75 / \$212.82 = 0.2667
NPV = – \$525 000 + [\$56.753(16 563) – \$80(10 000)] = – \$385 000

Accounting dilution takes place here because the market-to-book ratio is less than one. Market value dilution has occurred since the firm is investing in a negative NPV project.

Exercise 8.6

1. *Highest interest rate*

   (c) Unsecured notes

   (f) Bank overdraft

   (g) Unsecured bank fixed loan

   (e) Directors' loans

   (b) Debentures secured by floating charge

   (a) Mortgage loan

   (d) Convertible notes

2. Corporate debenture yields are generally higher. Preference shares are usually issued for a specific purpose so that the dividend rate is a secondary consideration. Promoters of a company going public may take preference shares to show their faith in the future of the company.

3. (a) Main differences:

   1. Debt carries no ownership interest.
   2. Interest paid on debt is tax deductible.
   3. Unpaid debt is a liability.

   (b) To gain tax benefits of debt and bankruptcy benefits of equity.

   (c)
   1. Preference shareholders receive a stated dividend.
   2. In case of liquidation, preference shareholders get a stated amount.
   3. Preference shares carry credit ratings.
   4. Preference shares are sometimes convertible into ordinary shares.
   5. Preference shares are sometimes callable.
   6. Preference shares may have a sinking fund.
   7. Preference shares may have an adjustable dividend.

4.

10%:	The dividend is 10% of the par value of the share (i.e. 10c = 10% × $1).
$1 par:	The par value of the share is the limit of the shareholder's liability.
Cumulative:	Arrears of dividends (from previous years) are paid before ordinary share dividends.
Redeemable:	At the option of the company, the company may redeem (buy back) the share.
Non-participating:	Should profits increase, the dividend does not increase.
Preference:	Preference is given to these shareholders (over ordinary shareholders) in payment of dividends and in repayment if the company is wound up.

Exercise 8.7

1.	**Return**	**Risk**	**Maturity**	**Liquidity**	**Marketability**
(a) Exchange traded shares	*high*	*high*	*high*	*med*	*high*
(b) Treasury notes	*low*	*low*	*low*	*high*	*high*
(c) Preference shares	*med*	*med*	*med*	*low*	*low*
(d) Corporate debentures	*med/ low*	*med/ low*	*low*	*med*	*med*
(e) Non-listed debentures	*high*	*high*	*low*	*low*	*low*
(f) Real estate	*low*	*low*	*high*	*low*	*low*

2. Number of periods per year = 365 / 60 = 6.08
   EAR = $(1 + .04 / .96)^{6.08} - 1 = 28.19\%$

3. **Short Company Ltd discounted values**

   Sun Bank bills

   90 days = (365 × 500 000) / (365 + (14.36 × 90 / 100) = $482 901.32
   180 days = (365 × 500 000) / (365 + (14.30 × 180 / 100) = $467 062.49

Cor Bank bills

90 days = (365 × 500 000) / (365 + (14.40 × 90 / 100) = $482 855.32
180 days = (365 × 500 000) / (365 + (14.00 × 180 / 100) = $467 708.86

Met Bank bills

90 days = (365 × 500 000) / (365 + (14.35 × 90 / 100) = $482 912.82
180 days = (365 × 500 000) / (365 + (14.10 × 180 / 100) = $467 493.21

The banks feel that the short-term rates are going to fall because the yields on the 180-day bills are lower than the 90-day yields. Short requires $480 000 for three or four months. It should use the Met Bank bill for 90 days (14.35 percent, $482 912.82) as this is the lowest cost to provide the level of funding required. If it needs the credit beyond 90 days (three months) it would have to enter into another arrangement. It is to be noted that, if Short obtains funds by selling a bill, it can always revise the position by buying a bill.

4. (a) Acceptor — party who endorses the bill to guarantee payment if the drawer defaults.

   (b) Payee — owner of the bill.

   (c) Drawer — party who issues the bill usually to borrow the funds.

   (d) Endorser — original acceptor or a subsequent receiver who purchases the bill for value.

   (e) Bearer — no role in a bank bill.

5. (a) Acceptor — not relevant.

   (b) Payee — owner of the note is the person to whom the promise is made. A note can be open so that the promise to pay is made to the bearer and not a specific payee.

   (c) Drawer — person engaging to pay on the note. This is the issuer.

   (d) Endorser — a note can be transferred by endorsement, however, once it is transferred no liability rests with the endorser.

   (e) Bearer — see payee.

Start me up: Where the money is

Peter Lewis

Source: Lewis, P. 1999, 'Start me up: Where the money is', *Age,* 16 Mar., p. 12.

There's cash in the US to back good ideas, but finding it requires contacts.

Having just attended Stanford University's Graduate School of Business' third annual Conference on Entrepreneurship (www.econference.org), I was more convinced than ever that lack of access to seed venture capital in Australia is one of the main barriers to increased entrepreneurial activities.

When I completed an electrical engineering degree, a quick survey of peers revealed that none wanted to start a business or to commercialise their research. Why?

'No money'—a funny situation for a country that routinely throws large sums of money at geologists who want to vacuum the ocean floor looking for diamonds.

Indeed, the lack of real seed venture capital seems to have bred out a generation of high-tech entrepreneurs in our great nation. The reverse is true in the United States.

The business professors at Stanford actively encourage their charges to do it themselves and routinely promote their students' projects to the many nearby venture capitalists (VCs) for investment.

One US VC, J. Neil Weintraut, of 21st Century Internet Venture Partners (www.21vc.com), says that new Internet ideas come at him so quickly 'they're like a firehouse'—and, in Silicon Valley, there's the money to fund them.

But, before you go racing off to the US to pitch your idea to VCs, have a look at home a bit more closely. The availability of venture capital in Australia has grown in recent years.

First port of call should be the Australian Venture Capital Association (www.avcal.com.au). AVCAL is the peak body for VCs in Australia and has hotlinks to the Web sites of all of the members. True believers will be horrified to learn that not all VCs provide capital for technology development—but a quick tour through a VC's site will establish the scope of interest for a given firm.

The site offers a number of interesting downloadable reports on the state of play of VC in Australia, which is a good way to get a feel for where the investment industry is going in terms of its support and expectations for technology investments.

But hey, you ask, what are these people going to do? Invest a pittance, take 50%+ of my company and then tell me how to run it? So-called 'vulture investors' are pretty much a figment of an entrepreneur's imagination—most experienced technology VCs don't necessarily want a large part of your business—they want a share that reflects their investment, but maintains a strong incentive for the management team to achieve.

Regardless of your feelings about VCs, remember that it's far better to own 70% of a $20m company than 100% of a $1m company.

But what about smaller capital requirements? The typical VC isn't going to want to spend $250,000 on due diligence for a $250,000 investment when they can invest a lot more in a bigger company for a higher potential return.

Fortunately, other options have emerged. There are a number of 'angel investors' in Australia, those high-net-worth individuals who look to invest in start-ups and provide guidance and introductions.

There are a number of angel organisations in Australia that are contactable through the various state chambers of commerce, such as the Victorian Employers Chamber of Commerce and Industry (www.vecci.org.au).

Alternatively, many lawyers and accountants act on behalf of such individuals, so a phone call to your own service providers will likely start to help you identify potential investors.

The Federal Government has also come to the aid of the start-up establishing a number of programs. AusIndustry (www.ausindustry.gov.au), a division of the Department of Industry Science and Resources (DISR), provides a variety of grants and loans to companies for basic R&D and commercialisation.

DISR also oversees the Industry Innovation Funds programme (IIF) (www.isr.gov.au/media/1998/november/nov98s%5F4.html). Established in 1997, the IIF has, to date, provided $130m, matched by $40m of private funding, to five Australian venture capitalists, to focus on seed and start-up stage investment in IT and biotechnology areas. And, yes, some of the current round of funds still have money left to invest in your company (assuming you have a halfway-decent idea).

The IIF is modelled on the United States' Small Business Investment Companies program and the Israeli Government's high-tech investment policies—policies that have led to more companies from Israel listing on Nasdaq (the primary US stock exchange for technology companies) than any country outside the US.

At least two of the IIF funds have strong links to the US venture market (and have offices in San Francisco). These funds see the potential to multiply their investment through some sort of US-based 'liquidity event' (to use the parlance of Silicon Valley), such as an Initial Public Offering (IPO), merger, acquisition or full listing on Nasdaq.

Fortunately, most Australian entrepreneurs who do 'cash out' in the US tend to do it all again in Australia, so we all benefit from their experience and their cash, which they tend to reinvest at home.

But, if you are having trouble getting funding in Australia, you can, of course, always seek overseas venture investment, particularly in Silicon Valley, where VC is substantially more plentiful.

But first, carefully analyse why Australian investors may not be interested in your product. If there are serious stumbling blocks, they'll be a issue wherever you go.

US VCs are generally relaxed about investing in Australian-sourced technology companies—assuming their product is at the cutting edge and a potential world beater—but are unlikely to invest directly in Australia. We're too far away and there's too little recourse if their investment goes sour.

The typical way that many Australian companies have successfully accessed the VC market in the US is to incorporate there, vest some intellectual property (so that the VCs have something to trade if the investment doesn't work) and send over some senior management to run the show and negotiate with the money people.

There are a number of Australian lawyers who can help you with this task.

And, while there are many hundreds of venture capital funds across the US, the majority of the technology-focused ones have congregated on Sand Hill Road in Menlo Park, just South of San Francisco, in the centre of Silicon Valley.

So just which VC do you call on? A scan of Red Herring (www.redherring.com), the pre-eminent magazine and online site for technology venture capitalists, will quickly provide insight and information on which VCs are currently investing in your particular segment of technology.

By and large, though, you will tend to get in the door of these firms only through an introduction through a lawyer or accountant and, even then, only if you've got a best-of-breed product.

John Doerr, managing partner of the legendary Silicon Valley firm, Kleiner Perkins Caulfield Byers (www.kpcb.com), seed investors in companies such as Compaq, Intuit, Macromedia, Lotus, Netscape, Sun, Symantec and Amazon.com, told me that he and his four partners see about 10 000 business plans a year of which they typically invest in only about eight each, or 40 a year.

When all is said and done, VCs the world over are out to make money and tend to analyse potential investments using three basic criteria: market opportunity, product and people. And, while the weightings for each vary according to a VC's particular preferences, they each are important and need to be highlighted in your business plans. One particularly hard-nosed VC I know weights the people component relatively low, justifying it by saying, 'we can always get new people'.

Talking of business plans, there are a number of resources to assist you in putting one together. There are quite a few Australian and foreign software packages available, some with 'wizards' to guide you along each step of the process.

In addition, there a number of online sites that provide guidance on putting together a business plan, although the best ones to help you raise venture capital are often found on the sites of the VCs themselves—for example, some of the AVCAL members, or through those VCs identified in the US through the Red Herring site.

Austrade cares about companies being able to raise venture capital because we want Australian companies to succeed internationally and access to funds is a major barrier to this success.

Austrade (www.austrade.gov.au) provides financial assistance to companies that have a product or service and want to enter overseas markets. Among its many services, it also offers the Export Market Development Grant (EMDG) that provides a retrospective grant of up to 50% of your costs of international market development, up to a maximum of about $250,000 per annum.

Peter Lewis is Australia's Consul-General and Senior Trade Commissioner in San Francisco.

Corporate long-term debt

R

S. Ross et al.

Source: Ross, S., Thompson, S., Christensen, M., Westerfield, R. & Jordan, B. 2001, *Fundamentals of Corporate Finance,* 2nd Austn edn, Irwin, Sydney, pp. 502–10.

In this section, we begin our discussion of corporate debt by describing in some detail the basic terms and features that make up a typical long-term corporate debt. We discuss additional issues associated with long-term debt in subsequent sections.

Securities issued by corporations may be classified roughly as *equity securities* and *debt securities.* At its crudest level, a debt represents something that must be repaid; it is the result of borrowing money. When corporations borrow, they promise to make regularly scheduled interest payments and to repay the original amount borrowed (that is, the principal). The person or firm making the loan is called the *creditor* or *lender.* The corporation borrowing the money is called the *debtor* or *borrower.*

From a financial point of view, the main differences between debt and equity are the following:

1. Debt is not an ownership interest in the firm. Creditors generally do not have voting power.

2. The corporation's payment of interest on debt is considered a cost of doing business and is fully tax deductible.

3. Unpaid debt is a liability of the firm. If it is not paid, the creditors can legally claim the assets of the firm. This action can result in liquidation or reorganisation, two of the possible consequences of bankruptcy. Thus, one of the costs of issuing debt is the possibility of financial failure. This possibility does not arise when equity is issued.

What is debt?

In simple terms, debt is an obligation to pay a specific amount of money to another party. It involves the lender advancing a sum of money (the principal) to the borrower for a specific period. In return, the borrower pays the lender an agreed rate of interest at specified intervals and at the end of the agreed period repays the outstanding balance. Some debt arrangements may be structured with equal regular payments which incorporate part principal repayment and the period interest payment. These ***are credit foncier*** loans and most home mortgages operate in this way.

The description of debt can be expanded by reference to the following characteristics:

- short-term versus long-term debt
- fixed versus floating interest rate loans
- secured versus unsecured debt
- domestic versus foreign debt.

Short-term debt usually means repayment periods from between one day and up to one year whereas long-term debt[1] is where the repayment period is greater than one year. Interest payable by the borrower may be set at a predetermined rate which is fixed for the term of the loan or at a floating (or variable) rate at a margin above a benchmark rate which is reset periodically in line with movements in market interest rates. Fixed rate loans tend to have higher interest rates than variable rate loans.

Interest rates may be capped. This means that for an upfront fee a loan, set at a floating rate, is guaranteed by the lender not to exceed some predetermined rate. For example, for a fee of $1500 a borrower may be able to undertake a loan for say 7 per cent which is capped to 8.5 per cent. The interest rate may go up or down but the highest rate (ceiling) paid will be 8.5 per cent over the term of the loan.

Secured debt provides the lender with legal access to assets of the borrower if it should be necessary to recover the original amount of the debt. When the debt is *unsecured* the lender is entirely dependent on the capacity and willingness of the borrower to repay the debt. Because of its lower risk of repayment of principal, secured debt has *a lower interest rate* than unsecured debt. A common security offered by Australian companies is a *floating charge* over the assets of the company. With a floating charge, the claim of the lender is not lodged over a specific asset or assets of the borrower but fixes on a specific asset or assets if the borrower fails to make a payment that has fallen due. The process of fixing on an asset or a group of assets is known as *crystallisation of the charge.* A floating charge allows the borrowing company to sell, buy or vary assets according to the requirements of business until there is a default in the loan repayments.

An unsecured lender can access corporate assets indirectly if the company goes into liquidation, but this class of lender ranks behind the secured lender. A *negative pledge* by a borrower is often required by the lender in conjunction with an unsecured debt. A negative pledge is an undertaking by the borrower not to use the assets to provide security (or any further security) for additional loans.

Borrowed funds may be sourced from within Australia in Australian dollars or borrowed offshore and denominated in either Australian dollars or a foreign currency. Chapter 23 looks at international corporate finance.

Long-term debt: The basics

The types of long-term debt products offered in the Australian corporate markets are:

- debentures
- secured and unsecured notes
- convertible notes
- fixed deposit loans
- mortgages
- eurobonds
- eurocurrency term loans (floating rate notes)
- leasing
- project finance
- transferable loan certificates
- derivative debt products.

Debentures are loans to the company offering fixed rates of interest for certain periods. They are usually secured by a fixed charge or floating charge over the assets of the company, and a trustee is appointed to protect the interests of holders. This is the most secure loan to a company.

Secured notes are for all practical purposes the same as debentures but their protection is usually a second mortgage over the assets so that they rank immediately behind the debenture holders in the situation of default.

Unsecured notes are also loans to the company but they are usually for shorter periods and no assets are set as security. The holders of the notes rank as ordinary creditors in the event of default.

Convertible notes are a cross between a loan and a share. They are similar to unsecured notes because they have fixed interest rates. However, the unique characteristic of a convertible note is that it can be converted on maturity, fully or partly, to ordinary shares or redeemed in full. The notes are usually issued at approximately the market price of the share (at the time of issue) and the interest rates offered are usually lower than the unsecured debt issue.

Fixed deposits are loans at fixed rates for definite terms. The rates are slightly higher than for unsecured notes. They rank as ordinary creditors in the event of default as no trust deed is filed. Unlike debentures or notes they are not traded or exchanged.

Mortgages are the conveyance of property for the security of the debt. The title of the property rests with the lender until the debt is repaid and then the property is reconveyed back to the borrower.

Eurobonds are fixed interest borrowings with maturities of five to ten years. The issue is guaranteed by an international syndicate of financiers (underwritten) and sold in countries other than the country of the currency in which the issue is denominated. They are unsecured and they are only accepted in the market if the borrower is considered to be substantial. Issues are usually greater than $50 million with an average of about $100 million. Australian companies that have raised borrowings through eurobonds are Alcoa of Australia Ltd, the BHP Co Ltd, Comalco Aluminium Ltd, TNT Limited, Coles Myer and Pacific Dunlop.

Eurocurrency floating rate notes (FRNs) are debt instruments with rates that are periodically adjusted to reflect market interest rates. Usually an Australian bank borrows the amount required in a foreign currency and then on-lends it to the Australian corporate borrower. The State Bank of Victoria, which subsequently managed to get into financial difficulties in 1989, raised $375 million in United States' dollars using two eurocurrency issues, a $250 million variable rate note issue and a $125 million 10-year floating rate issue.

The simplest form of *leasing* is *direct leasing* which involves only two parties: the supplier of the funds (as lessor) which purchases equipment and leases it to the customer (as lessee). The lease term may be about five years and repayments are at mutually suitable intervals ranging from monthly to annually. Repayments are sufficient to cover the capital cost of the leased goods plus some profit for the lessor. At the expiry of the term, the goods may be returned to the lessor, purchased by the lessor, or a further lease negotiated if the lessee wishes to continue using the goods.

The term *leveraged leasing* refers to a lease in which the lessor borrows to fund the purchase of the equipment to be leased. For example, a lessor wishing to purchase equipment costing $1 million would use say $0.2 million of its own funds, called the equity funds, and $0.8 of borrowed funds, called the debt funds. Generally the lessee's lease repayments would cover the repayment of the debt and related interest costs while the lessor would rely on depreciation and other taxation benefits to provide a return to cover the $0.2 million equity funds. The use of leveraged leasing has almost disappeared in Australia in recent years.

Cross border leasing is basically another form of leveraged lease involving parties in two or more countries designed to take advantage of differing tax regulations between countries. Queensland Rail and Stanwell Power Station are each involved in the cross border leasing of some of their assets. In Stanwell's case, this involves some of their generators. Normally the motivation for a cross border lease is to take advantage of differing tax regimes.

Project finance is used for large projects where the level of funding exceeds $100 million such as large mining projects like the Argyle Diamond project ($400 million) and the Sydney Harbour Tunnel. The arrangement usually involves a sponsoring company (or companies), the project and the lender. Most project finance raised in Australia is limited recourse financing. This means that before completion of the project the lenders have restricted access to the sponsoring companies for repayment of debt in event of problems with the loan. Once a project is completed, lenders only have recourse to the project's cash flows and assets. Completion is therefore vital for the lender and the borrowing companies.

Transferable loan certificates (TLC) are certificates evidencing the existence of a debt which can be traded by the holder. The transferable certificates are generally of three- to five-year maturities. In its 1999 annual report Westpac states that it had arranged a fully drawn committed TLC facility of $300 million with a three-year maturity.

Derivative debt products

With the deregulation of the Australian financial system, corporations, government entities and financial institutions have become concerned with managing interest rate risk. As a result derivative products have been constructed to assist in the management. These derivatives include:

- interest rate swaps
- forward rate agreements (FRAs)
- interest rate futures
- options on futures contracts.

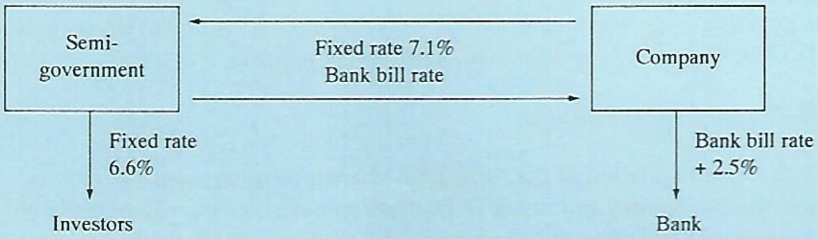
No new underlying securities are issued; however, the derivatives act as a form of insurance. For example, a forward rate agreement (FRA) is an agreement between two parties on an interest rate for a specified period from a specified future settlement date, based on an agreed notional principal amount. No commitment is made between the parties to the FRAs to lend or borrow the principal amount. The exposure to both parties in this arrangement is only the difference between the agreed interest rate and the settlement rate applicable at the date of settlement. So a borrower can combine an FRA with a variable interest loan to fix the interest rate that will be paid in the overall package. Interest rate futures and options on futures contracts are arrangements that allow borrowers and lenders to lock into interest rates. Although the arrangements are different the outcomes are similar to the FRAs.

Interest rate swaps allow companies to use their credit standing to reduce their overall cost. Consider as an example a company and a semi-government authority. The company, due to its credit rating, may be unable to raise funds from the long- term debt market or, if so, only at a very high cost. It would therefore be willing to pay a premium to obtain fixed rate finance. On the other hand, the semi-government authority, which has a higher credit rating, can access the long-term debt market and the short-term money market at a relatively low cost.

Assume the semi-government authority can raise 3-year fixed interest funds at 6.60 per cent per annum or variable rate funds at the bank bill rate which is 6.40 per cent per annum. The company can borrow long-term fixed interest funds at 10.50 per cent per annum or variable rate funds at the bank bill rate plus 2.5 per cent per annum. The interest rate charges can be summarised as:

Type of interest rate	*Semi-government authority*	*Company*	*Interest rate differential*
1 Floating rate	Bank bill rate	Bank bill rate + 2.5%	2.5%
2 Fixed rate	6.60% p.a.	10.50% (if available)	3.9%

Figure 16.1 Interest rate swap



Both parties can borrow in the market in which they get the best relative terms and then enter an interest rate swap to exchange the terms of their funding and achieve a lower cost than would otherwise have been available. The semi-government authority issues fixed securities and the company issues bank bills. Both parties then enter into an interest rate swap as shown in Figure 16.1.

The semi-government authority is prepared to swap its fixed rate obligation for floating rate funds at the bank bill rate for a fee of say 0.50 per cent.

The cost of funds is then reduced to both borrowers as indicated below.

	Semi-government authority (rate%)	*Company (rate%)*
Pays to investors/bank	6.60	Bank bill + 2.50
Received from counterparty	(7.10)	(Bank bill)
Pays to counterparty	Bank bill	7.10
Net cost	Bank bill – .50	9.60
Alternative cost:	Bank bill	10.50 Fixed rate
Cost savings:	.50	0.90

Because of its reimbursement of the bank bill rate from the semi-government authority, the company has converted its variable rate borrowing to a fixed rate borrowing. The rate of 9.60 per cent per annum, which it is paying, is made up of:

Semi-government authority's cost	+	the fee for the swap	+	its variable margin over bank bills
= 6.6%	+	.50%	+	2.50%
= 9.60%				

So an interest rate swap basically consists of the exchange between two counterparties of a fixed interest rate for a floating interest rate. The amount of interest to be paid is calculated by reference to a notionally agreed principal. Principal amounts are not physically exchanged in an interest rate swap.

Is it debt or equity?

Sometimes it is not clear if a particular security is debt or equity. For example, suppose a corporation issues a perpetual debenture with interest payable solely from corporate income if and only if earned. Whether this is really a debt or not is hard to say and is primarily a legal and semantic issue. Courts and taxing authorities would have the final say.

Corporations are very adept at creating exotic, hybrid securities that have many features of equity but are treated as debt. Obviously, the distinction between debt and equity is very important for tax purposes. So one reason that corporations try to create a debt security that is really equity is to obtain the tax benefits of debt and the bankruptcy benefits of equity.

As a general rule, equity represents an ownership interest, and it is a residual claim. This means that equity holders are paid after debt holders. As a result of this, the risks and benefits associated with owning debt and equity are different. To give just one example, the maximum reward for owning a straight debt security is ultimately fixed by the amount of the loan, whereas there is no necessary upper limit to the potential reward from owning an equity interest.

These securities with characteristics of debt and equity are called *hybrid securities* or *mezzanine debt.* Types of hybrid securities are:

- convertible notes
- subordinated debt
- preference shares.

Convertible notes have been explained above. Subordinate loans may be provided by a major shareholder to a company with the condition that they will not be repaid until all creditors have been paid in full. Preference shares are explained later.

For example, BTR Nylex Ltd completed a private placement of equity hybrids to raise $630 million. BTR Nylex issued non-maturing convertible notes at a fixed interest rate of 9 per cent to raise the funds. At the time debt interest rates were considerably higher than this. In the balance sheet, the company showed the convertible notes as part of the group capital.

The debenture trust deed

The *debenture trust deed* is the written agreement between the corporation (the borrower) and its creditors. Usually, a trustee (a bank or public auditor) is appointed by the corporation to represent the debtholders as trustee. The trustee must (1) make sure the terms of the trust deed are obeyed, (2) manage the sinking fund (described below), and (3) represent the debtholders in default—that is, if the company defaults on its payments to them.

The trust deed is a legal document. It can run several hundred pages and generally makes for very tedious reading. It is an important document, however, because it generally includes the following provisions:

1. the basic terms of the issue
2. the amount of the debentures issued
3. a description of property used as security
4. the repayment arrangements
5. the call provisions
6. details of the protective covenants.

We discuss these features next.

Terms of the issue

Corporate debt usually has a face value (i.e. a denomination) of $100 (note: overseas markets, in particular Japan and the United States, use a face value of $1,000). This is called the *principal value* and it is stated on the debt certificate. So, if a corporation wanted to borrow $1 million, 10,000 debentures would have to be sold.

Corporate debt is usually in *registered form.* For example, the trust deed might read as follows:

> *Interest is payable semiannually on 1 July and 1 January of each year to the person in whose name the debenture is registered at the close of business on 15 June or 15 December, respectively.*

This means that the company will record the ownership of each debenture and record any changes in ownership. The company will pay the interest and principal by cheque mailed directly to the address of the owner of record.

Alternatively, the debenture could be in *bearer form.* This means that the certificate is the basic evidence of ownership, and the corporation will 'pay the bearer'.

There are two drawbacks to bearer debentures. First, they are difficult to recover if they are lost or stolen. Second, because the company does not know who owns its debt, it cannot notify debtholders of important events. Bearer debentures are not common in Australia.

Security

Debt securities are classified according to the collateral and mortgages used to protect the debtholder.

Collateral is a general term that, strictly speaking, means securities (e.g. debentures and shares) that are pledged as security for payment of debt. However, the term 'collateral' is often used much more loosely to refer to any form of security.

Mortgage securities are secured by a mortgage on the real property of the borrower. The property involved is usually real estate, for example, land or buildings. The legal document that describes the mortgage is called a mortgage trust deed. The floating charge mortgage was discussed earlier.

In Australia the term 'debentures' is used for secured company debt and 'notes' for unsecured debt. The term 'bond' is used to identify government or semi-government debt. In the United States, the term 'bond' is used to denote secured corporate debt, 'debenture' is used for unsecured debt, and 'note' for unsecured debt with a maturity date less than 10 years.

Repayment

Debt can be repaid at maturity, at which time the debtholder will receive the stated or face value of the debt, or they may be repaid in part or in entirety before maturity. Early repayment in some form is more typical and is often handled through a sinking fund.

A *sinking fund* is an account managed by the debenture trustee for the purpose of repaying the debt. The company makes annual payments to the trustee, who then uses the funds to retire a portion of the debt. The trustee does this by either buying up some of the debt in the market or calling in a fraction of the outstanding debt. This second option is discussed in the next section.

There are many different kinds of sinking fund arrangements, and the details would be spelled out in the trust deed.

The call provision

A call provision allows the company to repurchase or 'call' part or all of the debt issue at stated prices over a specific period. Corporate debt is usually callable.

Generally, the call price is above the debenture's stated value. The difference between the call price and the stated value is the *call premium.* The amount of the call premium usually becomes smaller over time. One arrangement is to initially set the call premium equal to the annual coupon payment and then make it decline to zero the closer the call date is to maturity.

Call provisions are not usually operative during the first part of the debt's life. This makes the call provision less of a worry for debtholders in the debt's early years. For example, a company might be prohibited from calling its debt for the first 10 years. This is a *deferred call.* During this period, the debt is said to be *call protected.*

Protective covenants

A *protective covenant* is that part of the trust deed that limits certain actions a company might otherwise wish to take during the term of the loan. Protective covenants can be classified into two types: negative covenants and positive (or affirmative) covenants.

A *negative covenant* is a 'thou shalt not'. It limits or prohibits actions that the company may take. Here are some typical examples:

1. The firm must limit the amount of dividends it pays according to some formula.
2. The firm cannot pledge any assets to other lenders.
3. The firm cannot merge with another firm.
4. The firm cannot sell or lease any major assets without approval by the lender.
5. The firm cannot issue additional long-term debt.

Protective covenants

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3. The firm cannot merge with another firm.
4. The firm cannot sell or lease any major assets without approval by the lender.
5. The firm cannot issue additional long-term debt.

A *positive covenant* is a 'thou shalt'. It specifies an action that the company agrees to take or a condition the company must abide by. Here are some examples:

1. The company must maintain its working capital at or above some specified minimum level.
2. The company must periodically furnish audited financial statements to the lender.
3. The firm must maintain any collateral or security in good condition.

This is only a partial list of covenants; a particular trust deed may feature many different ones.

Notes

1 There is no universally agreed-upon distinction between short-term and long-term debt. In addition, people often refer to intermediate-term debt, which has a maturity of more than one year and less than three to five, or even ten years.

Debt ratings

S. Ross et al.

Source: Ross, S., Thompson, S., Christensen, M., Westerfield, R. & Jordan, B. 2001, *Fundamentals of Corporate Finance,* 2nd Austn edn, Irwin, Sydney, pp. 510–13.

The two leading debt-rating firms are Moody's and Standard & Poor's (S&P). Australian Ratings is the business name of Standard & Poor's (Australia) Pty Ltd.

John Moody (1868–1958) laid the foundations for Moody's Investors Service in 1900, when he published *Moody's Manual of Industrial and Corporation Securities.* In 1909, Moody introduced the first bond ratings as part of *Moody's Analyses of Railroad Investments.* He used the 'Aaa' through 'C' symbols that have since become a world standard to rate some 1,500 individual securities of over 200 US railroads. From the very beginning, Moody assigned independent rating opinions to help his investor readers manage credit risk. Then—as now—Moody's ratings were based on public information and assigned without the request of issuers.

Current as of April 30, 2000,

	Bonds and notes		**Bank deposits**	
	Long-term	**Short-term**	**Long-term**	**Short-term**
Australia	Aa2	P-1	Aa2	P-1

Table 16.1: Rating code used

LONG-TERM RATINGS

Aaa Bonds which are rated **Aaa** are judged to be of the best quality. They carry the smallest degree of investment risk and are generally referred to as 'gilt edged'. Interest payments are protected by a large or by an exceptionally stable margin and principal is secure. While the various protective elements are likely to change, such changes as can be visualised are most unlikely to impair the fundamentally strong position of such issues.

Aa Bonds which are rated **Aa** are judged to be of high quality by all standards. Together with the **Aaa** group they comprise what are generally known as high-grade bonds. They are rated lower than the best bonds because margins of protection may not be as large as in **Aaa** securities or fluctuation of protective elements may be of greater amplitude or there may be other elements present which make the long-term risk appear somewhat larger than the **Aaa** securities.

A Bonds which are rated **A** possess many favourable investment attributes and are to be considered as upper-medium-grade obligations. Factors giving security to principal and interest are considered adequate, but elements may be present which suggest a susceptibility to impairment some time in the future.

Baa Bonds which are rated **Baa** are considered as medium-grade obligations (i.e. they are neither protected nor poorly secured). Interest payments and principal security appear adequate for the present but certain protective elements may be lacking or may be characteristically unreliable over any great length of time. Such bonds lack outstanding investment characteristics and in fact have speculative characteristics as well.

Ba Bonds which are rated **Ba** are judged to have speculative elements; their future cannot be considered as well-assured. Often the protection of interest and principal payments may be very moderate, and thereby not well safeguarded during both good and bad times over the future. Uncertainty of position characterises bonds in this class.

B Bonds which are rated **B** generally lack characteristics of the desirable investment. Assurance of interest and principal payments or of maintenance of other terms of the contract over any long period of time may be small.

Caa Bonds which are rated **Caa** are of poor standing. Such issues may be in default or there may be present elements of danger with respect to principal or interest.

Ca Bonds which are rated **Ca** represent obligations which are speculative in a high degree. Such issues are often in default or have other marked shortcomings.

SHORT-TERM RATINGS

Moody's short-term debt ratings are opinions of the ability of issuers to repay punctually senior debt obligations. These obligations have an original maturity not exceeding one year, unless explicitly noted.

Moody's employs the following three designations, all judged to be investment grade, to indicate the relative repayment ability of rated issuers:

Prime-1 Issuers rated **Prime-1** (or supporting institutions) have a superior ability for repayment of senior short-term debt obligations. **Prime-1** repayment ability will often be evidenced by many of the following characteristics:

- Leading market positions in well-established industries.
- High rates of return on funds employed.
- Conservative capitalisation structure with moderate reliance on debt and ample asset protection.

- Broad margins in earnings coverage of fixed financial charges and high internal cash generation.
- Well-established access to a range of financial markets and assured sources of alternate liquidity.

Prime-2 Issuers rated **Prime-2** (or supporting institutions) have a strong ability for repayment of senior short-term debt obligations. This will normally be evidenced by many of the characteristics cited above but to a lesser degree. Earnings trends and coverage ratios, while sound, may be more subject to variation. Capitalisation characteristics, while still appropriate, may be more affected by external conditions. Ample alternate liquidity is maintained.

Prime-3 Issuers rated **Prime-3** (or supporting institutions) have an acceptable ability for repayment of senior short-term obligations. The effect of industry characteristics and market compositions may be more pronounced. Variability in earnings and profitability may result in changes in the level of debt protection measurements and may require relatively high financial leverage. Adequate alternate liquidity is maintained.

In their own words ...

Edward I. Altman on junk debentures*

One of the most important developments in corporate finance over the last decade has been the re-emergence of publicly owned and traded low-rated corporate debt. Originally offered to the public in the early 1900s to help finance some of our emerging growth industries, these high yield/high risk debentures virtually disappeared after the rash of debenture defaults during the depression. In the last 12 years, however, the junk debenture market has been catapulted from an insignificant element in the corporate fixed income market to one of the fastest growing and most controversial types of financing mechanisms.

The term *junk* enamates from the dominant type of low-rated debenture issues outstanding prior to 1977 when the ‘market’ consisted almost exclusively of original issue investment grade debentures that fell from their lofty status to a higher default risk, speculative grade level. These so-called ‘fallen angels’ amounted to about $8.5 billion in 1977. At the beginning of 1990, fallen angels comprised about 20 per cent of the $200 billion publicly owned junk debenture market.

Beginning in 1977, issuers began to go directly to the public to raise capital for growth purposes. Early users of junk debentures were energy-related firms, cable TV companies, airlines, and assorted other industrial companies. This type of financing is a form of securitization of what heretofore was the sole province of private placements financed by banks and insurance companies. The emerging growth company rationale coupled with relatively high returns to early investors helped legitimize this sector. Most investment banks ignored junk debentures until 1983–1984, when their merits and profits potential became more evident.

Synonymous with the market’s growth was the emergence of the investment banking firm, Drexel Burnham Lambert, and its junk debenture wizard, Michael Milken. Drexel established a potent network of issuers and investors and rode the wave of new financing and the consequent surge in secondary trading to become one of the powerful investment banks in the late 1980s. The incredible rise in power of this firm was followed by an equally incredible fall resulting first in a government civil indictment and huge fine for various misdealings and finally the firm's total collapse and bankruptcy in February 1990. In April 1990, Milken pleaded guilty to various violations of the securities law.

By far the most important and controversial aspect of junk debenture financing was its role in the corporate restructuring movement from 1965–1989. High leverage transactions and acquisitions, such as leveraged buyouts (LBOs), which occur when a firm is taken private, and leveraged recapitalizations (debt for equity swaps) transformed the face of corporate America leading to a heated debate as to the economic and social consequences of firms being transformed from public to private enterprises with debt/equity ratios of at least 6:1.

These transactions involved increasingly large companies and the multibillion dollar takeover became fairly common, finally capped by the huge $25+ billion RJR Nabisco LBO in 1989. LBOs were typically financed with about 60 per cent senior bank debt, about 25–30 per cent subordinated public debt (junk debentures) and 10–15 per cent equity. The junk debenture segment is sometimes referred to as 'mezzanine' financing because it lies between the 'balcony' senior debt and the 'basement' equity.

These restructurings resulted in huge fees to advisors and underwriters and huge premiums to the old shareholders who were bought out, and they continued as long as the market was willing to buy these new debt offerings at what appeared to be a favorable risk/return tradeoff. The bottom fell out of the market in the last six months of 1989 due to a number of factors including a marked increase in defaults, government regulation against S&Ls (savings and loans—a US form of financial institution) holding junk debentures, fears of higher interest rates and a recession, and, finally, the growing realization of the leverage excesses of certain ill-conceived restructurings. The default rate in 1989 jumped from about 2 per cent to 4 per cent, involving over $8 billion of debt. The pendulum of growth and returns swung dramatically in the opposite direction as junk debenture prices plummeted, yields skyrocketed, and new issues dried up. The leverage boom of the 1980s appeared to be over.

Will the junk debenture market survive? Yes, it probably will, but the growth will almost certainly slow dramatically, and the new offerings will revert back to more soundly financed capital structures. Restructurings will also continue with the mezzanine debt increasingly of the private placement variety.

* *Edward I. Altman is Max L. Heine Professor of Finance at the Stern School of Business of New York University. He is widely recognised as one of the American experts on bankruptcy and the credit analysis associated with high yield or 'junk' debentures.*

Rights

S. Ross et al.

Source: Ross, S., Thompson, S., Christensen, M., Westerfield, R. & Jordan B. 2001, *Fundamentals of Corporate Finance,* 2nd Austn edn, Irwin, Sydney, pp. 553–61.

When new ordinary shares are sold to the general public, the proportional ownership of existing shareholders will likely be reduced. However, if a preemptive right is contained in the firm's articles of association, then the firm must first offer any new issue of shares to existing shareholders. If the articles of association do not include a preemptive right, the firm has a choice of offering the issue of shares directly to existing shareholders or to the public.

An issue of ordinary shares offered to existing shareholders is called a *rights offering* or a *privileged subscription.* In a rights offering, each shareholder is issued rights to buy a specified number of new shares from the firm at a specified price within a specified time, after which time the rights are said to expire.

The mechanics of a rights offering

To illustrate the various considerations a financial manager has in a rights offering, we will examine the situation faced by the Deb and Stef Company Ltd, whose abbreviated initial financial statements are given in Table 17.8.

Table 17.8 Deb and Stef Company Ltd's financial statement before rights offering

Balance Sheet

Assets		*Shareholders' equity*	
		Ordinary shares	$5 000 000
		Retained earnings	10 000 000
Total	$15 000 000	Total	$15 000 000

Earnings Summary

Earnings before taxes	$ 3 278 689
Taxes (39%)	$1 278 689
Net Profit	$2 000 000
Earnings per share	$2
Issued shares	1 000 000
Market price per share	$20
Total market value	$20 000 000

As indicated in Table 17.8, Deb and Stef earns \$2 million after taxes and has 1 million shares outstanding. Earnings per share are thus \$2, and the shares sell for \$20, or 10 times earnings (i.e. the price-earnings ratio is 10). To fund a planned expansion, the company intends to raise \$5 million of new equity funds by a rights offering.

To execute a rights offering, the financial management of Deb and Stef will have to answer the following questions:

1. What should the subscription price per share be for the new shares?
2. How many shares will have to be sold?
3. How many shares will each shareholder be allowed to buy?

Also management will probably want to ask:

4. What is the likely effect of the rights offering on the per share value of the existing shares?

It turns out that the answers to these questions are highly interrelated. We will get to them in just a moment.

The early stages of a rights offering are the same as for the general cash offer. The difference between a rights offering and a general cash offer lies in how the shares are sold. With a rights offer, Deb and Stef's existing shareholders are informed that they are entitled to rights based on the number of shares they own. Deb and Stef will then specify how many shares a shareholder needs to buy one additional share at a specified price.

To take advantage of the rights offering, shareholders have to exercise the rights by filling out a subscription form and sending it, along with payment, to the company or its agent. Shareholders of Deb and Stef will actually have several choices: (1) exercise and subscribe for the full number of entitled shares, (2) sell their rights in the market, or (3) do nothing and let the rights expire. As we discuss below, this third course of action is inadvisable.

Number of rights attaching to each share

Deb and Stef wants to raise \$5 million in new equity. Suppose that the subscription price is set at \$10 per share. How Deb and Stef arrived at that price is something we will discuss below, but notice that the subscription price (of \$10 per share) is substantially less than the current \$20 per share market price.

At \$10 per share, National Power will have to issue 500 000 new shares. This can be determined by dividing the total amount of funds to be raised by the subscription price:

$$\begin{aligned}\text{Number of new shares} &= \frac{\text{Funds to be raised}}{\text{Subscription price}} \qquad (17.1)\\ &= \$5\,000\,000 / \$10\\ &= 500\,000 \text{ shares}\end{aligned}$$

As there are 1 000 000 old shares outstanding, Deb and Stef will need to issue one share for every two shares currently issued if it is to reach the target of 500 000 new shares. Therefore the rights issue is a 1-for-2 issue, that is shareholders are entitled to one right for every two shares held currently.

It should be clear that the subscription price, the number of new shares, and the number of rights attaching to each share are interrelated. For example, Deb and Stef can lower the subscription price. If so, more new shares will have to be issued to raise $5 million in new equity. Several alternatives are worked out here:

Subscription price	*Number of new shares*	*Terms of rights issue*
$20	250 000	1 for 4
10	500 00	1 for 2
5	1 000 000	1 for 1

The value of a right

Rights clearly have value. In the case of Deb and Stef, the right to be able to buy a share worth $20 for $10 is definitely worth something.

Suppose a shareholder of Deb and Stef owns two shares just before the rights offering. This situation is depicted in Table 17.9. Initially, the price of Deb and Stef is $20 per share, so the shareholder's total holding is worth 2 × $20 = $40. The Deb and Stef rights offer gives shareholders with two shares the opportunity to purchase one additional share for $10.

The holding of the shareholder who exercises the right and buys a new share would increase to three shares. The total investment would be $40 + 10 = $50 (the $40 initial value plus the $10 paid to the company).

Table 17.9 The value of rights: the individual shareholder

Initial position	
Number of shares	2
Share price	$20
Value of holding	$40
Terms of offer	
Subscription price	$10
Number of shares to obtain 1 new share	2
After offer	
Number of shares	3
Value of holdings	50
Share price	16.67
Value of a right per share	
Old price - new price	$20 – 16.67 = $3.33
Value of a right	$3.33 × 2 shares = 6.67

Table 17.10 National Power Company rights offering

Initial position	
Number of shares	1 million
Share price	$20
Value of firm	$20 million
Terms of offer	
Subscription price	$10
Number of new shares issued	.5 million
After offer	
Number of shares	1.5 million
Value of firm	$25 million
Share price	$16.67
Value of a right per share	
Old price - new price	$20 – 16.67 = $3.33
Value of a right	3.33 × 2 shares = $6.67

The shareholder now holds three shares, all of which are identical. Since the total cost of buying these three shares is $40 + 10 = $50, the price per share must end up at $50/3 = $16.67 (rounded to two decimal places).

Table 17.10 summarises what happens to National Power's share price. If all shareholders exercise their rights, the number of shares will increase to 1 million + .5 million = 1.5 million. The value of the firm will increase to $20 million + 5 million = $25 million. The value of each share will thus drop to $25 million/1.5 million = $16.67 after the rights offering.

The difference between the old share price of $20 and the new share price of $16.67 reflects the fact that the old shares carried rights to subscribe to the new issue. The difference must be equal to the value of the rights that attach to the share, that is, $20 – 16.67 = $3.33. Because a shareholder must hold two shares in order to obtain the right, the value of the right is $3.33 × 2 shares = $6.67 (to account for previous rounding). Using the formula presented earlier in the chapter we have:

$$\begin{aligned}\text{Value of a right} &= n\left(\frac{M-S}{n+r}\right)\\ &= 2\left(\frac{20-10}{2+1}\right)\\ &= \$6.67\end{aligned}$$

An investor holding no shares of outstanding Deb and Stef capital who wants to subscribe to the new issue can do so by buying rights. Suppose an outside investor buys a right. This will cost $6.67. If the investor exercises the right at a subscription price of $10, the total cost would be $10 + 6.67 = $16.67. In return for this expenditure, the investor will receive a new share which, as we have seen, is worth $16.67.

Example 17.1: Exercising your rights

In the Deb and Stef example, suppose the subscription price was set at $8. How many shares will have to be sold? How many shares would you need to buy a new share? What is the value of a right? What will the price per share be after the rights offer?

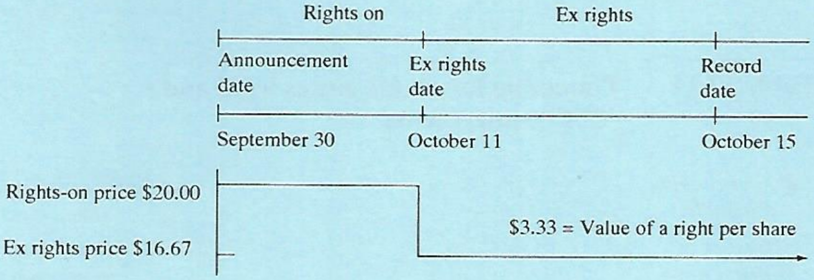
To raise \$5 million, \$5 million/\$8 = 625 000 shares will need to be sold. There are 1 million shares outstanding and 625 000 more shares have to be issued so that for every 8 shares currently held 5 new shares would have to be issued. You would need to own 1.6 shares currently to have the right to buy the new share. After the rights offer, there will be 1.625 million shares, worth \$25 million all together, so the per share value is \$25/1.625 = \$15.38 each. The value of a right in this case is the \$20 original price less the \$15.38 ending price, multiplied by the number of shares to obtain a right or

$$n\left(\frac{M-S}{n+r}\right)$$

$$= 8\left(\frac{20-8}{8+5}\right)$$

$$= \$7.38$$

Figure 17.3 **An example of going ex rights**



In a rights offering, there is a date of record, which is the last day that a shareholder can establish legal ownership. However, shares are sold ex rights four business days before the record date. Before the ex rights day, the share sells rights on, which means that the purchaser receives the rights.

Ex rights

Deb and Stef's rights have a substantial value. In addition, the rights offering will have a large impact on the market price of Deb and Stef's share price. It will drop by \$3.33 on the day when the shares trade *ex rights.*

> *Ex rights*—Period when shares are selling without a recently declared right, normally beginning four days before the holder-of-record date.
>
> *Holder-of-record date*—The date on which existing shareholders on company records are designated as the recipients of share rights. Also the date of record.

The standard procedure for issuing rights involves the firm's setting a *holder-of-record date*—a books' closing date. Following Stock Exchange rules, the share typically goes ex rights four trading days before the books' closing date. If the share is sold before the ex rights date—'rights-on', 'with rights', or 'cum rights'—the new owner will receive the rights.

After the ex rights date, an investor who purchases the shares will not receive the rights. This is depicted for Deb and Stef in Figure 17.3.

As illustrated, on 30 September, Deb and Stef announced the terms of the rights offering, stating that the rights would be mailed on, say, 1 November to shareholders of record as of 16 October. Since 12 October is the ex rights date, only those shareholders who own the share on or before 11 October will receive the rights. Table 17.11 provides a timetable for rights issues (renounceable and non-renounceable) as required under Corporations Law and the Stock Exchange Listing Requirements.

Example 17.2: Exercising your rights: Part II

The Televue Entertainment Co. has proposed a rights offering. The shares currently sell for \$4. Under the terms of the offer, shareholders will be allowed to buy one new share for every five that they own at a price of \$2.50 per share. What is the value of a right? What is the ex rights price?

$$\text{The value of a right is: } 5\left(\frac{4-2.50}{5+1}\right)=\$1.25$$

As the right value attaches to 5 shares, the value of a right per share is \$1.25/5 = \$0.25. The ex-rights price per share is \$4 – \$0.25 = \$3.75.

Table 17.11 Timetable for rights issues legal and ASX requirements

Renounceable timetable *Number of business days elapsed*		*Non-renounceable timetable* *Number of business days elapsed*
0	Issue announced	0
1	Prospectus lodged with Exchange & ASC	1
12	Securities quoted 'ex-rights'	12
12	Rights trading begins	–
16	Books' closing date	16
21	Prospectus dispatched to shareholders	21
36	Last day of rights trading	–
36	Applications closing date	31 (earliest)
37	Trading in 'deferred delivery' market begins	32
46	Renunciations closing date	–
56	Last allotment date	51
66	Last day for dispatch of certificates	61

Example 17.3: Right on

In example 17.2, suppose the rights only sold for \$1 instead of the \$1.25 we calculated. What could you do?

You can get rich quick, because you have found a money machine. Here's the recipe: Buy a right for \$1. Exercise it and pay \$2.50 to get a new share. Your total investment to get one ex-rights share is \$1 + \$2.50 = \$3.50. Sell the share for \$3.75 and pocket the \$0.25 difference. Repeat as desired.

This looks very easy but remember there is no such thing as a free lunch so the situation cannot exist.

Effects on shareholders

Shareholders can exercise their rights or sell them. In either case, the shareholder will not win or lose by the rights offering. The hypothetical holder of two shares of Deb and Stef has a portfolio worth $40. If the shareholder exercises the rights, he or she ends up with three shares worth a total of $50. In other words, by spending $10, the investor's holding increases in value by $10, which means that the shareholder is neither better nor worse off.

On the other hand, if the shareholder sells the right for $6.67, he or she would have two shares worth $16.67 and the cash from selling the right:

Shares held = 2 × $16.67	= $33.33
Right sold	= $6.67
Total	= $40.00

The new $33.33 market value plus $6.67 in cash is exactly the same as the original holding of $40. Thus shareholders cannot lose or gain from exercising or selling rights.

It is obvious that after the rights offering, the new market price of the firm's shares will be lower than it was before the rights offering. As we have seen, however, shareholders have suffered no loss because of the rights offering. Thus, the share price decline is very much like a share split, a device that is described in Chapter 19. The lower the subscription price, the greater is the price decline of a rights offering. It is important to emphasise that because shareholders receive rights equal in value to the price drop, the rights offering does not hurt shareholders.

Table 17.12 Costs of flotation as a percentage of proceeds*

Size of issue ($ millions)		Number	Compensation as a percentage of proceeds	*Cash offers* Other expenses as a percentage of proceeds	Total cost as a percentage of proceeds
Under 0.50		0	–	–	–
0.50 to	0.99	6	6.96%	6.78%	13.74%
1.00 to	1.99	18	10.40	4.89	15.29
2.00 to	4.99	61	6.59	2.87	9.47
5.00 to	9.99	66	5.50	1.53	7.03
10.00 to	19.99	91	4.84	0.71	5.55
20.00 to	49.99	156	4.30	0.37	4.67
50.00 to	99.99	70	3.97	0.21	4.18
100.00 to	500.00	16	3.81	0.14	3.95
Total/average		484	5.02%	1.15%	6.17%

* Based on 578 common stock issues registered under the *Securities Act* of 1933 during 1971–75. The issues are subdivided by size of issue and method of financing: cash offers, rights with standby underwriting, and pure rights offering.

Issues are included only if the company's stock was listed on the NYSE, AMEX, or regional exchanges before the offering; any associated secondary distribution represents less than 10 per cent of the total proceeds of the issue, and the offering contains no other types of securities. The costs reported are: (1) compensation received by investment bankers for underwriting services rendered, (2) legal fees, (3) accounting fees, (4) engineering fees, (5) trustees' fees, (6) printing and engraving expenses, (7) SEC registration fees, (8) federal reserve stamps, and (9) state taxes.

Modified from C.W. Smith, Jr. 'Costs of underwritten versus rights issues', *Journal of Financial Economics,* 5 December 1977, p. 277 (Table 1).

The new issues puzzle

In the United States, firms use general cash offers much more often than rights offerings. In Table 17.12, of the 578 (484 + 56 + 38)total issues 94 (56 + 38), or 16 per cent, were rights offers. In the United States, this reliance on general cash offers is something of a mystery because rights offerings are usually much cheaper in terms of flotation costs.

To get an idea of the relative flotation costs, Table 17.12 shows these costs from one study expressed as a percentage of the amount raised for different issue sizes and selling procedures. Overall, general cash offers had average flotation costs equal to 6.17 per cent of the amount raised. For rights offerings with standby underwriting, total costs were 6.05 per cent. For pure rights offerings (those involving no underwriter), these costs were only 2.45 per cent of the amount raised, a significant savings.

Overall, Table 17.12 suggests that pure rights offerings have a pronounced cost advantage. Furthermore, rights offerings protect the proportionate interest of existing shareholders. No one knows why rights offerings are not used more often, and it is an intriguing anomaly.

Table 17.12 (Continued)

	Rights with standby underwriting			*Pure rights*	
Number	Compensation as a percentage of proceeds	Other expenses as a percentage of proceeds	Total cost as a percentage of proceeds	Number	Total cost as a percentage number of proceeds
0	–	–	–	3	8.99%
2	3.43%	4.80%	8.24%	2	4.59
5	6.36	4.15	10.51	5	4.90
9	5.2	2.85	8.06	7	2.85
4	3.92	2.18	6.10	6	1.39
10	4.14	1.21	5.35	3	0.72
12	3.84	0.90	4.74	1	0.52
9	3.96	0.74	4.70	2	0.21
5	3.50	0.50	4.00	9	0.13
56	4.32%	1.73%	6.05%	38	2.45%

Various arguments in favour of general cash offerings with underwriting have been put forth:

1. Underwriters increase the share price. This is supposedly accomplished because of the selling effort of the underwriting group.

2. Underwriters provide insurance against a failed offering. This is true. If the market price goes below the offer price, the firm does not lose, because the underwriter bought the shares at an agreed-upon price. However, this insurance cannot be worth much, because the offer price is not set (in most cases) until within 24 hours of the offering when the final arrangements are made and underwriters have made careful assessment of the market for the shares.

3. Other arguments include (a) the proceeds of underwritten issues are available sooner than with a rights offer, (b) underwriters will provide a wider distribution of ownership than would be true with a rights offering, and (c) consulting advice from investment bankers may be beneficial.

All of the preceding arguments are pieces of the puzzle, but none seems very convincing. One recent study has found that firms making underwritten rights offers suffered substantially larger price drops than did firms making underwritten cash offers.[1] This is a hidden cost, and it may be part of the reason that underwritten rights offers are uncommon in the United States.

In recent years rights offerings may have almost disappeared in the United States; however, this is not the Australian experience. Table 17.13 provides data for Australian equity issues made from 1988 to 1998. There is a tendency in Australia to rely on existing shareholders for funds and rights issues are almost equal to new issue raising. If we exclude the new issues that relate to new companies being floated we can derive the cash offer figure which was only 12 per cent of the funds raised in 1998. No doubt Australian taxation law has provided the incentive for the dividend reinvestment schemes (refer to Chapter 19 where dividend imputation is discussed) but again this seems to emphasise the contact with existing shareholders. This relationship could be explained by the smaller Australian market, but one still wonders at the use of what seems to be a more expensive method (cash offers) as opposed to the less expensive method (rights issues) in the United States.

Table 17.13 Types of equity capital raised by percentage

	Rights	Placements	Dividend reinvesment	Staff	Total	New floats	Total ($ millions)
1988	6,702.10	1,694.40	568.9	716.1	9,681.50	1,170.00	10.851.50
	61.8%	15.6%	5.2%	6.6%	89.2%	10.8%	100.0%
1989	2,314.20	1,698.60	2,418.00	1.082.10	7,512.90	1,704.20	9,217.10
	25.1%	18.4%	26.2%	11.7%	81.5%	18.5%	100.0%
1990	2,347.10	1,059.60	2,514.00	1,043.00	6,963.70	463.1	7,426.80
	31.6%	14.3%	33.9%	14.0%	93.8%	6.2%	100.0%
1991	2,724.50	1,825.20	2,017.10	615.5	7,182.30	1,942.30	9,124.60
	29.9%	20.0%	22.1%	6.7%	78.7%	21.3%	100.0%
1992	4,415.50	2,620.90	2,645.30	903.80	10.585.50	3,694.40	14,279.90
	30.9%	18.4%	18.5%	6.3%	74.1%	25.9%	100.0%
1993	978.7	5,450.30	2,738.10	1,330.50	10,497.60	5,347.70	15,845.30
	6.2%	34.4%	17.3%	8.4%	66.3%	33.7%	100.0%
1994	3,678.90	3,344.60	3,651.40	1,642.90	12,317.80	4,710.10	17,027.90
	21.6%	19.6%	21.4%	9.6%	72.3%	27.7%	100.0%
1995	2,867.00	2,103.80	3,264.00	1,632.80	9,867.60	4,111.80	13.979.40
	20.5%	15.0%	23.3%	11.7%	70.6%	29.4%	100.0%
1996	1,662.00	5,423.00	3,188.90	1,300.90	11,574.80	3,711.20	15,286.00
	10.9%	35.5%	20.9%	8.5%	75.7%	24.3%	100.0%
1997	4,010.90	2,861.40	3,347.40	2,241.50	12,461.20	12,861.90	25,323.10
	15.8%	11.3%	13.2%	8.9%	49.2%	50.8%	100.0%
1998	3,436.20	4,887.70	3,631.70	8,026.6*	19,982.20	8,856.00	28,838.20
	11.9%	16.9%	12.6%	27.8%	69.3%	30.7%	100.0%

Source: Australian Stock Exchange

Notes

1 Robert S. Hansen, 'The demise of the rights issue', *The Review of Financial Studies* 1, Fall, 1988, pp. 289–309.

Short-term financing sources

S. Ross et al.

Source: Ross, S., Thompson, S., Christensen, M., Westerfield, R. & Jordan, B. 2001, *Fundamentals of Corporate Finance*, 2nd Austn edn, Irwin, Sydney, pp. 482–7.

It follows from the earlier discussion that short-term borrowing should be used for working capital requirements in the day-to-day operations of the business, and for transactions that are self-financing over short periods. Industries with seasonal peaks and troughs, and those engaged in international trade, will be heavy users of short-term finance. There are many methods through which a firm can secure short-term finance and these include:

- overdrafts
- short-term loans
- bills of exchange
- promissory notes/commercial paper
- inventory loans
- letters of credit
- short-term eurocurrency advances
- factoring
- mortgage securitisation.

This list is not exhaustive as new forms of lending are developed continuously in response to market needs. Current market rates of interest applicable to some of the short-term financing are provided in the daily press. The main providers of short-term finance are trading banks, merchant banks and finance companies. Superannuation funds and brokers operate in the area as purchasers of marketable securities.

Overdrafts

Overdraft lending by trading banks has been a common source of short-term finance in Australia. An overdraft is a credit arrangement where the bank permits the customer to extend the bank account into deficit, up to an agreed limit. Funds deposited to the bank account reduce the deficit balance so that working funds will reduce the outstanding balance and its related interest until they are used. Interest is calculated on the daily balance outstanding and it is charged quarterly in arrears. Interest rates are negotiated; however, banks publish a single indicator rate, the 'prime' rate, for overdrafts of $10 000 or more. The 'prime' rate is generally a minimum of 1 per cent above short-term bank bill rates and most overdraft arrangements are linked to rates higher than the 'prime' rate. The interest rate is variable so that it is subject to market movements. Other charges are overdraft facility fees and an unused overdraft limit fee.

Overdrafts are subject to annual reviews and the bank would expect the customer to reduce the limit. It is repayable on demand, though banks rarely exercise this discretion.

The use of overdraft finance is declining. Banks are encouraging customers to move to other forms of short-term finance because the overdraft arrangements create a high degree of uncertainty as to how much of the bank's funds will need to be committed to this line of credit. In addition, firms can operate in the short-term money market to obtain lower cost funds.

Short-term loans

Banks are also the large providers of short-term loans. A short-term loan is an advance of funds usually made for a specific purpose rather than for working capital. Unlike the overdraft, which may be recalled on demand, a term loan is for a fixed period. It involves a formalised system of repayments. The repayments may be structured to include principal and interest; however, interest-only loans are available. In the case of the latter arrangement, all principal is repaid as a lump sum at the end of the term period. Interest rates may be fixed or variable; however, the rapidly increasing rates that occurred during the 1980s have encouraged lenders to write variable interest contracts.

As rates declined in the early 1990s lenders moved towards fixed interest contracts until the end of 1998. The threat of increasing rates began to develop early in 1999 and the loan tendency shifted towards encouraging variable interest contracts.

A form of short-term loan (though these may also be established on a long-term basis) is the *facility agreement* or *letter*. A facility arrangement will provide a source of funds that may be drawn upon at any time. For example a real estate speculator may have a facility arrangement for $1m dollars. The speculator knows that bids may be made on property up to $1m dollars and the funds will be available. If a property is purchased for $450,000, then $550,000 will remain in the facility to be drawn at a later date. The agreement letter will specify the term, interest rate, period of notice (if any) for drawing on the facility, details of fees and the repayment pattern.

Bills of exchange

A bill of exchange is a negotiable instrument. The legal definition is an unconditional order in writing addressed by one person to another signed by the person giving it, requiring the person to whom it is addressed to pay on demand, or at a fixed or determinable future time, a sum certain in money to the order of a specified person, or bearer. When a bill is used to lend money, the funds for lending may come from a third party. Some bills are accepted or endorsed by a bank so that the bank agrees to pay the third party at maturity if the borrower defaults. The main use of bills of exchange in Australia is as a means of obtaining credit, but they are not necessarily related to specific trading transactions. Bills not related to trade transactions are called *accommodation bills*. Trade bills are still used extensively for the financing of exports and imports, and there continues to be a demand for local financing of goods between Australian companies by way of trade bills. However, the bill of exchange has proved to be most adaptable to the financing of all sectors of Australian industry and commerce. The use of the bill of exchange has expanded rapidly. A significant advantage of bill financing is that it enables users of funds to defer, in the appropriate circumstances, the raising of permanent equity or debt capital. Its flexibility to meet variations in cash flow cycles is another principal advantage.

There are three parties involved in a bill of exchange:

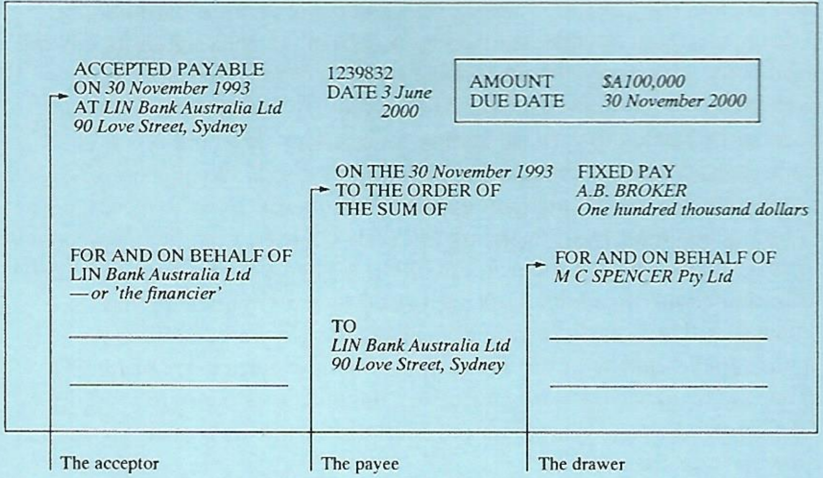
- *The drawer.* The party who issues the order is the drawer. This is usually the borrower of the funds. In the example in Figure 15.7, the drawer is M.C. Spencer Pty Ltd who has issued the order of $100 000 and agreed that the bill will be paid as stated. M.C. Spencer Pty Ltd has the obligation to repay the $100 000 on presentation of the bill at maturity.

- *The acceptor.* The party who endorses the bill is the acceptor. In the example LIN Bank Australia Ltd has signed as acceptor to agree to pay the bill if M.C. Spencer Pty Ltd defaults.

- *The payee.* The payee is the owner of the bill. In the example the owner is A.B. Broker, who is entitled to be paid $100,000 on 30 November 2000. If there are successive owners there will be endorsements to record the transfers on the back of the bill. Figure 15.8 shows that the bill has moved from A.B. Broker (on 17.8.2000) to Mary T. Fashions Pty Ltd and then from Mary T. to Hungry Investments Ltd (on 15.10.2000). If Hungry Investments holds the bill until maturity, it will collect the $100 000 from M.C. Spencer Pty Ltd.

A bill of exchange is normally paid out by the acceptor of the bill on its due date (the acceptor is reimbursed by the drawer). The *Bills of Exchange Act* provides for the protection of the holders of the bills. The liability for repayment runs from the acceptor, to the drawer, then to the endorsers (last endorser to first endorser). While bank bills are bearer securities, most professional market transactions are settled in the Australian system. Securities traded through the system are lodged with Austraclear and transfer of title and cash settlements are effected electronically.

Figure 15.7 Bank accepted bill of exchange



ACCEPTED PAYABLE
ON *30 November 1993*
AT *LIN Bank Australia Ltd*
90 Love Street, Sydney

1239832
DATE *3 June 2000*

AMOUNT	*$A100,000*
DUE DATE	*30 November 2000*

ON THE *30 November 1993* TO THE ORDER OF THE SUM OF

FIXED PAY
A.B. BROKER
One hundred thousand dollars

FOR AND ON BEHALF OF
LIN *Bank Australia Ltd*
—or 'the financier'

TO
LIN Bank Australia Ltd
90 Love Street, Sydney

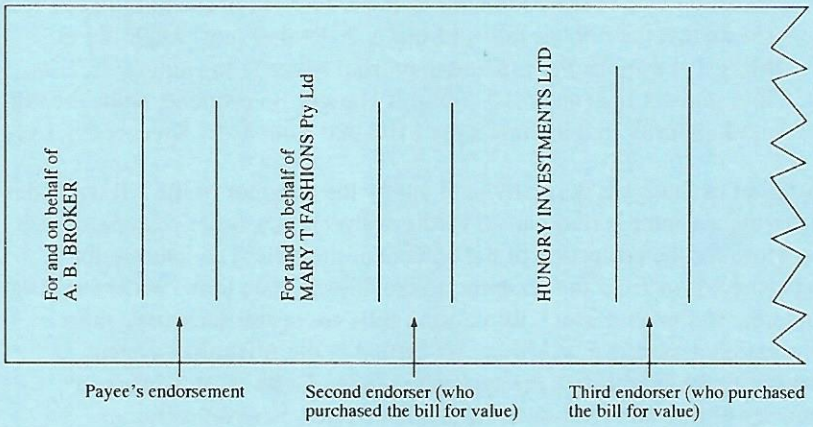
FOR AND ON BEHALF OF
M C SPENCER Pty Ltd

While the maximum period of a bill is 180 days, banks will arrange a bill facility so that the period may be extended from 180 days to 3 or 5 years. For a charge of about .5 per cent on top of the bank bill rate, the bank will guarantee the rolling over of bills so that the drawer is assured of being able to replace the maturing bill with a new bill. When funds are borrowed through a bill facility, the actual amount received is less than the face value of the bill. The face value of the bill is discounted according to the discount yield formula, which provides:

Discounted value

$$= (365 \times \text{Face value})/(365 + (\text{Yield} \times \text{Days to maturity}/100))$$

Figure 15.8 Reverse side of a bank accepted bill of exchange



Example 15.1 Discounted receipts from bills of exchange.

What is the discounted receipts on the following bills of exchange?

Bill	*Face value*	*Term*	*Yield per annum*
A	$100 000	90 days	10%
B	$100 000	180 days	10%
C	$100 000	90 days	15%

Discounted value, Bill A

$= (365 \times \$100\ 000)/(365 + (10 \times 90/100)) = \$97\ 593.58$

Discounted value, Bill B

$= (365 \times \$100\ 000)/(365 + (10 \times 180/100)) = \$95\ 300.26$

Discounted value, Bill C

$= (365 \times \$100\ 000)/(365 + (15 \times 90/100)) = \$96\ 433.29$

It should be obvious from the formula and the calculations that the discounted receipts of a bill are dependent upon the interest rate (yield) and the term to maturity. Note that the amount received varies inversely with the interest rate.

In relation to bill A, the interest paid would be $100 000 – $97 593.58 = $2406.42.

The rate of interest is:

$$\frac{\$2406.42}{\$97\ 593.58} \times 100\% = 2.466\% \text{ for 90 days}$$

At an annual rate, this is:

$$\frac{2.466 \times 365}{90}\% = 10.00\%$$

which is the yield per annum specified in the problem.

Promissory notes

A **promissory note** is an unconditional promise in writing made by one person to another, signed by the maker, engaging to pay, on demand or at a fixed or determinable future time, a sum certain in money, to the order of a specified person, or to the bearer. A promissory note involves two parties only, the issuer and the bearer (see Figure 15.9). There is no acceptor and they are marketable without endorsement. Once a promissory note is sold, the seller has no further liability. In the case of a bill of exchange, the endorsers have a contingent liability until the bill matures. Promissory notes are unsecured borrowing and therefore their use tends to be restricted to large organisations seeking funds such as Telecom Australia, Qantas, BHP Finance Ltd, Boral Limited and Pacific Dunlop Ltd. There is a very active secondary market for promissory notes.

Inventory loans

Inventory loans, short-term loans to purchase inventory, come in three basic forms: blanket liens, trust receipts and field warehouse financing.

1. *Blanket inventory lien.* A blanket lien gives the lender a lien against all the borrower's inventories (the blanket 'covers' everything).

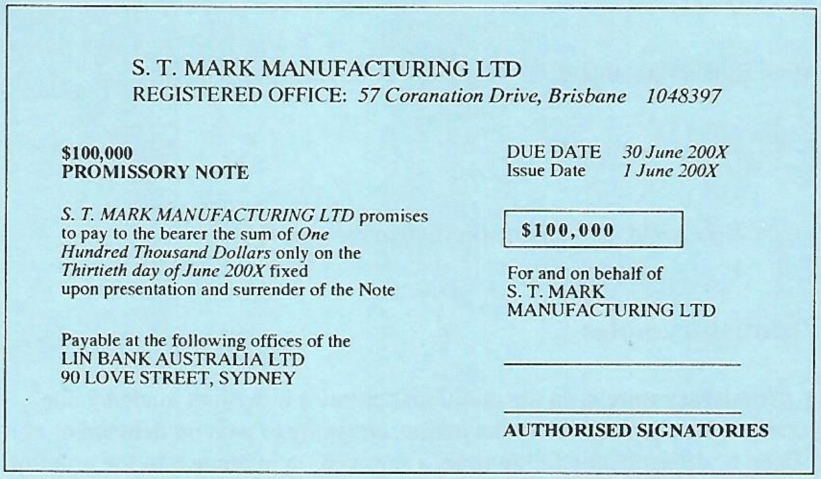
2. *Trust receipt.* A trust receipt is a device in which the borrower holds specific inventory in 'trust' for the lender. Automobile dealer financing, for example, is done by trust receipts. However, it is somewhat cumbersome to use trust receipts for, say, wheat grain.

3. *Field warehouse financing.* In field warehouse financing, a public warehouse company (an independent company that specialises in inventory management) acts as a control agent to supervise the inventory for the lender.

Letters of credit

A letter of credit is an irrevocable and unconditional undertaking by a bank to repay the principal and interest of a loan in the event of default by the borrower. For example, lower status borrowers can use promissory note borrowings with the backing of a letter of credit, issued under a trust deed and confirmed (guaranteed) by an Australian bank. The issue yields then reflect the borrowings status of the bank. The lender is relying on the bank should the borrower default.

Figure 15.9 Promissory note



S. T. MARK MANUFACTURING LTD
REGISTERED OFFICE: *57 Coranation Drive, Brisbane 1048397*

$100,000
PROMISSORY NOTE

DUE DATE *30 June 200X*
Issue Date *1 June 200X*

S. T. MARK MANUFACTURING LTD promises to pay to the bearer the sum of *One Hundred Thousand Dollars* only on the *Thirtieth day of June 200X* fixed upon presentation and surrender of the Note

$100,000

For and on behalf of
S. T. MARK
MANUFACTURING LTD

Payable at the following offices of the
LIN BANK AUSTRALIA LTD
90 LOVE STREET, SYDNEY

AUTHORISED SIGNATORIES

Short-term eurocurrency funding

The eurocurrency market developed following World War II. American companies, followed by American banks, expanded internationally. American aid and funds financed postwar reconstruction. A lot of companies, and countries, decided to keep their US dollars in Europe, hence the development of the euromarket and eurocurrencies which are deposits of a currency held outside the country of issue. The word 'euro' is derived from the Greek meaning external and has nothing to do with Europe. Eurocurrency loans can be provided by banks and merchant banks in a variety of currencies such as euro-yen, euro-dollars, euro $A. The advances are usually for six to twelve months for amounts of $5 million upwards and are drawn and repaid in one single amount. Other euromarket short-term debt instruments include euronotes and eurocommercial paper. These consist of short-term notes issued by large low-risk firms.

Factoring

Factoring or selling of accounts receivable has already been discussed in Chapter 14. Recall that factoring is a continuous arrangement between the company and the factor, which ensures that as soon as a sale is made, the proceeds are immediately available to the company. Funds are injected by use of this facility into the working capital of the business, thereby improving cash flow and the company does not have to commit administrative time to the collection of debts if it does not maintain the debtors ledger.

International comparison

Table 15.4 gives some indication of the different arrangements that exist in the Australian, Hong Kong and Singapore markets. Australia has a wider range of products on offer and would tend to have a more active secondary market.

Table 15.4: International comparison: Short-term financial arrangement

	Australia		Hong Kong		Singapore	
	Market		Market		Market	
Arrangement	**Primary**	**Secondary**	**Primary**	**Secondary**	**Primary**	**Secondary**
Bank bill	x	x				
Promissory notes	x	x	x	x		
Commercial notes	x	x	x		x	x
Exchange funded bills			x	x		
Inventory loans	x	x	x	x	x	x
Facility letters	x	x				
Factoring	x	x	x	x	x	x

Some different types of debenture—and preference shares

S. Ross et al.

Source: Ross, S., Thompson, S., Christensen, M., Westerfield, R. & Jordan, B. 2001, *Fundamentals of Corporate Finance,* 2nd Austn edn, Irwin, Sydney, pp. 513–22.

A: Some different types of debenture

Thus far, we have considered 'plain vanilla' debentures. In this section, we look at some more unusual types: zero coupon debentures, floating-rate debentures, and others.

Zero coupon debentures

A debenture that pays no coupons at all must be offered at a price that is much lower than its stated value. Such debentures are called *zero coupon debentures*, or just *zeroes.*[1]

Suppose the DDB Company issues a $100 face value five-year zero coupon debenture. The initial price is set at $49.70. It is straightforward to check that, at this price, the debenture yields 15 per cent to maturity. The total interest paid over the life of the debenture is $100 – 49.70 = $50.30.

For tax purposes, the issuer of a zero coupon debenture deducts interest every year even though no interest is actually paid. Similarly, the owner must pay taxes on interest accrued every year as well, even though no interest is actually received.

Floating-rate debentures

The conventional debentures we have talked about so far have fixed-dollar obligations because the coupon rate is set as a fixed percentage of the face value. Similarly, the principal is set equal to the face value. Under these circumstances, the coupon payment and principal are completely fixed.

With *floating-rate debentures (floaters),* the coupon payments are adjustable. The adjustments are tied to an interest rate index such as the commercial bank bill rate. For example, Citibank issued $850 million of floating-rate notes. The coupon rate was set at 1 per cent above the 90-day Treasury bill rate and adjusted semi-annually.

The value of a floating-rate debenture depends on exactly how the coupon payment adjustments are defined. In most cases, the coupon adjusts with a lag to some base rate. For example, suppose a coupon-rate adjustment is made on 1 June. The adjustment might be based on the simple average of bank bill yields during the previous three months. In addition, the majority of floaters have the following features:

1. The holder has the right to redeem the note at face value on the coupon payment date after some specified amount of time. This is called a *put* provision, and it is discussed below.

2. The coupon rate has a floor and a ceiling, meaning that the coupon is subject to a minimum and a maximum. In this case the coupon rate is said to be 'capped', and the upper and lower rates are sometimes called the 'collar'.

Other types of debenture

Since debentures are financial contracts, the possible features are only limited by the imagination of the parties involved. As a result, debentures can be fairly exotic, particularly some more recent issues. We discuss a few of the more common features and types next.

Income debentures are similar to conventional debentures, except that coupon payments are dependent on company income. Specifically, coupons are paid to debtholders only if the firm's income is sufficient. This would appear to be an attractive feature, but income debentures are not very common.

A *put debenture* allows the *holder* to force the issuer to buy the debt back at a stated price. The put feature is therefore just the reverse of the call provision and is a relatively new development. We discuss convertible debentures, call provisions and put provisions in more detail in Chapter 20.

A given debenture may have many unusual features. To give just one example, Merrill Lynch created a very popular debenture called a *liquid yield option note,* or LYON ('lion'). A LYON is the 'kitchen sink' of debentures: a callable, puttable, convertible, zero coupon, subordinated note. Valuing a debenture of this sort can be quite complex.

A relatively recent development in Australia has been the establishment of a secondary market in mortgages. *Securitisation* is the process of taking assets that are not very marketable and turning them into financial assets that can be bought and sold in the marketplace. Briefly, mortgages are pooled and securities are issued secured by the mortgages. These securities find a ready market due to the high quality of the mortgage backing. The concept of mortgage securitisation dates back to the late 1930s in the United States, when the government deliberately encouraged securitisation of mortgages so that housing finance could become more readily available to purchasers. Mortgages, backed by the government and insured through recognised agencies, are pooled and shares in the pool sold.

The process benefits both the investor and the mortgage agency. The investor has the advantage of a security that gives both a regular income from the interest payments on the mortgages, and an additional payout once the mortgages have been paid back. The security is readily negotiable in the marketplace. The mortgage agency has the advantage of turning what would otherwise be a series of individual illiquid assets into an immediate source of funds. This gives the agency liquidity and allows it to use the funds for other purposes. This market has two segments, being *mortgage* and *non-mortgage securitisation.* In the mortgage securitisation market, home buyers borrow from a financial institution. The financial institution sells the mortgage to an originator who then pools the mortgages and issues securities to investors. Investors receive say fixed interest payments quarterly. Well-known mortgage originators are Aussie Home Loans and RAMS. The non-mortgage securitisation market is a lot smaller. In this relatively underdeveloped market an income stream is packaged into investment securities and sold to investors. David Bowie recently securitised the royalties to his songs. In 1998 the size of the securitisation market was $19 billion.

B: Preference shares

Preference shares differ from ordinary shares because they have preference over ordinary shares in the payment of dividends and in the distribution of corporation assets in the event of liquidation. 'Preference' means only that the holders of the preference shares must receive a dividend (in the case of an ongoing firm) before holders of ordinary shares are entitled to anything.

Preference shares are a form of equity from a legal and tax standpoint. Importantly, holders of preference shares sometimes have no voting privileges.

Stated value

Preference shares have a stated liquidating value. The cash dividend is described in terms of dollars per share. For example, J.C. Ludowici Ltd has issued 5 per cent preference shares of $1 and 6 per cent preference shares of $1, which translate to dividend payments of 5 cents and 6 cents per year respectively. On 2 June 1992 a final dividend of 2.5 cents was paid on the 5 per cent preference shares to provide a coupon return of 5 per cent. Because the market price of the shares had fallen from $1 on issue to 45 cents, the yield provided by the 5 per cent coupon was 11.11% (5 cents/45 cents of 100%).

Cumulative and non-cumulative dividends

A preference dividend is *not* like interest on a debenture. The board of directors may decide not to pay the dividends on preference shares, and their decision may have nothing to do with the current net income of the corporation.

Dividends payable on preference shares are either *cumulative* or *non-cumulative;* most are cumulative. If preference dividends are cumulative and are not paid in a particular year, they will be carried forward as an *arrearage.* Usually both the cumulated (past) preference dividends plus the current preference dividends must be paid before the ordinary shareholders can receive anything.

Unpaid preference dividends are *not* debts of the firm. Directors elected by the ordinary shareholders can defer preference dividends indefinitely. However, in such cases:

1. ordinary shareholders must also forgo dividends;
2. holders of preference shares are often granted voting and other rights if preference dividends have not been paid for some time.

Because preference shareholders receive no interest on the cumulated dividends, some have argued that firms have an incentive to delay paying preference dividends. However, if this was the expectation of investors, companies would have much difficulty in selling these types of securities.

Irredeemable or redeemable

An irredeemable preference share is similar to an ordinary share as the amount subscribed does not have to be repaid unless the company is liquidated. Preference shares may be issued so that they are automatically redeemable on the happening of some event or that they are redeemable at the option of the company.

Non-participating or participating

Preference shares are usually issued under terms that provide for a fixed rate of dividend. The shares are not entitled to a dividend in excess of the stated rate. In contrast, participating preference shares grant the holders the right to participate in the distribution of profit available to ordinary shareholders. The lower bound of the dividend is fixed by the stated rate; however, the participating preference share can have the rate increased because of additional profits.

> *Most preference shares issued are cumulative, irredeemable and non-participating.*

Because the interest paid on debt is tax deductible for the borrowing company and the preference share dividend is not tax deductible, the cost of servicing debt is less than the cost of servicing preference shares. In consequence the interest payment on debt tends to be higher than the preference dividend, even though repayment of the preference capital ranks behind repayment of the debt. So why would any investor be interested in contributing preference capital?

Usually preference issues are made for purposes other than the direct motive of raising funds. For example, persons floating a company may take preference shares in order to demonstrate confidence in the project. In the period 1987 to August 1989 there was a significant volume of redeemable preference shares issued in Australia (approximately $2.3 billion) to take advantage of tax laws and pass on franking benefits to the holders of the shares. In August 1989 the tax laws were changed to kill the market for franked preference shares. Redeemable preference shares are sometimes used to enhance the balance sheet by increasing the equity base. For example, James Hardie in 1988 made an issue of redeemable preference shares with detachable options over ordinary shares. James

Hardie classified the redeemable preference shares as equity in its annual accounts.

Banks have an incentive to issue preference shares because as subordinate debt[2] they are treated within the capital base of the bank. The Reserve Bank regulations require banks to meet capital adequacy requirements so that their operations are limited by the amount of capital invested. The Reserve Bank regulations relating to capital adequacy show how various types of preference share issues fit into the capital base. The three classes of bank capital according to the regulations are:

1. Equity
    - ordinary shares
    - non-cumulative irredeemable preference shares
    - retained earnings
2. Subordinate non-term debt
    - cumulative irredeemable preference shares
    - mandatory convertible notes
    - perpetual subordinate debt
3. Subordinate term debt
    - redeemable preference shares
    - subordinate term loans

Firms issuing preference shares can avoid the threat of bankruptcy that might otherwise exist if debt were relied on. Unpaid preference dividends are not debts of a company, and preference shareholders cannot force the company into bankruptcy because of unpaid dividends. Further, the tax advantage of interest deductibility of debt only exists for companies with significant tax liabilities, therefore companies with accumulated tax losses may favour the use of preference shares. This is particularly true when the firm finds it difficult to borrow on a long-term basis.

Another reason for issuing preference shares concerns the control of the firm. Since preference shareholders often cannot vote, preference shares may be a means of raising equity without surrendering control. In 1984 an issue of participating preference shares was proposed for John Fairfax Ltd. The objective of the issue was to simulate a non-voting ordinary share with equal dividend rights to ordinary shares (after an initial period when the preference shares would pay a higher dividend). At the time, John Fairfax was a listed public company, it needed more equity, but the family shareholders did not want to dilute their control. Hence the appeal of non-voting ordinary shares. There was no tax motive. The ASX, as a matter of principle, refused to list the shares, because it refuses to list non-voting ordinary shares and analysed the proposed issues as *de facto* ordinary shares. The issue did not proceed but this proposal provides an example of the desire to maintain control.

Notes

1 A debenture issued with a very low coupon rate (as opposed to a zero coupon rate) is an original issue/deep discount debenture.

2 *Subordinate debt* is a loan where the obligation of the borrower to repay the debt on maturity ranks below ordinary unsecured creditors.

The public issue

S. Ross et al.

Source: Ross, S., Thompson, S., Christensen, M., Westerfield, R. & Jordan, B. 2001, *Fundamentals of Corporate Finance,* 2nd Austn edn, Irwin, Sydney, pp. 536–41.

Australian company law has been characterised by a lack of uniformity from state to state because the Commonwealth Parliament was not given a clear power by the Constitution to make laws with respect to all companies. In May 1988, the Commonwealth proposed legislation including the *Corporations Act* 1989 which was to bring about a single law for companies in Australia. Over the next two years there was intense political debate over the Commonwealth legislation and scheme, with most of the states hostile to the proposal. Eventually in 1990, a Heads of Agreement, Future Regulation in Australia, was signed by all states. The main features of this agreement were:

- the *Corporations Act* and the *Australian Securities Commission Act* were amended to apply as law for the Australian Capital Territory and then applied by each state and the Northern Territory as the law of that state or Territory;
- the applied law was to have the characteristics of and be treated for all practical purposes as Commonwealth rather than state law;
- the Australian Securities Commission (ASC) was to be the sole administering authority replacing the National Companies and Securities Commission (NCSC) and State Corporate Affairs Commissions;
- the ASC was to be accountable to the Commonwealth Attorney-General and Parliament;
- regional offices were to be established in each capital city and the ASC was obliged to delegate the exercise of powers to Regional Commissioners to the fullest extent practicable;
- the ASC and Commonwealth crime authorities were to replace the NCSC and state crime authorities for prosecution of offences under the legislation.

In May 1996 the Federal Government established the Financial Systems Inquiry, chaired by Stan Wallis. The Wallis inquiry completed a report and made recommendations for regulatory reform.

As a result, in 1998 the powers of the ASC were expanded and it became the Australian Securities and Investments Commission (ASIC).

These features of the Heads of Agreement sought to create a legislative scheme that 'federalised' state law so as to create a single national law. This was achieved by means of a complex arrangement set out in the *Corporations Legislation Amendment Act 1990*. This Act overcame the constitutional problems by applying the *Corporations Act 1989* to the Australian Capital Territory and making it capable of being applied as state law.

The regulation for the raising of funds in Australia is through the Corporations Law which is administered by the ASC. The main areas of regulation are:

- the prospectus provisions (ss. 1017–1034)
- the restrictions on allotment of shares (ss. 1035–1043)
- the securities—hawking provisions (ss. 1077–1082)
- the accounts and audit provisions (ss. 283–334)
- the provisions relating to the sale of prescribed interests (ss. 1063–1076)
- the debenture provisions which are scattered throughout the Act
- the takeover provisions which regulate the sale of shares during takeovers
- the provisions licensing persons engaged in the securities industry (Part 7.3).

In addition to the ASC controls, the Australian Stock Exchange (ASX) regulates the disclosure that must be provided by listed companies.

The basic procedure for a new issue

[*Prospectus*—The document required by law, to be issued with share offers to the public.]

There is a series of steps involved in issuing securities to the public. In general terms, the basic procedure is as follows:

1. An analysis is made of the funding needs of the corporation and identification of the alternative methods of meeting those needs.
2. Approval from the board of directors is required before securities may be issued by management to the public. There may be a need to increase authorised shares which requires a vote of shareholders.
3. Expert opinion is obtained from external parties for support of the issue.
4. (a) The issue is structured and priced.
    (b) A timetable for the issue is prepared.
    (c) A prospectus for the issue is prepared.
    (d) A marketing strategy for the issue is prepared.

5. The prospectus is filed with the ASC and the ASX.
6. The underwriting agreement is executed.
7. The prospectus is registered.
8. (a) A public announcement is made of the offering and any sub-underwriting arrangement by the underwriter.
    (b) The prospectus is dispatched to potential investors.
9. Funds are received.
10. Shares are allotted and holdings registered.
11. Shares are listed for trading on the ASX.

Flotation is the term used to describe the function of offering securities to the public. It is used in the sense of 'launching' a company or an investment onto the markets. When the company is going to the market for the first time it is called a *'primary issue'*. Clearly a *primary issue* has to be a general cash offer. Primary issues are generally used to:

1. convert from a private company to a public company;
2. spin-off a portion of the business of a listed company; usually this involves the prospectus issue of new shares with shareholders of the listed company given a priority right of subscription;
3. form a new public company, to commence a business or to acquire a business, process or invention.
4. in recent times it has been to privatise a public organisation (for example Telstra, CBA, TAB) or to demutualise an insurance fund (AMP, Colonial, National Mutual). Under mutualisation the insurance policyholders have ownership rights. When the insurance fund becomes a public company these rights move to shareholders who in some cases may be policyholders.

The decision to go public is one that requires careful analysis. The process of going public is complicated and, once listed, the management and board of the company are subject to pressures and scrutiny that are unique to the public area.

Advantages of public company listing

1. Access to additional capital

This is the principal advantage of a public flotation and listing. Private companies commonly reach a stage where the financing of further growth is beyond the capacity of the existing shareholders. Equity funds raised from the initial public issue are available to expand operations, increase working capital or reduce borrowings. The establishment of a market for the company's securities and the broader shareholder base enhance further capital raisings and generally enables the company to satisfy its financial requirements on more favourable terms.

2. ***Increased negotiability of capital***

   This is an important consequence of listing, both from the vendor's/promotor's viewpoint and that of the company. Listing facilitates the realisation of investments and enables the vendors/promotors to reduce their financial commitment to the company.

3. ***Growth not limited by cash resources***

   From the company's standpoint, it is able to use its securities as consideration in mergers and acquisitions. Thus its capacity to grow and diversify is not constrained by limited cash resources.

4. ***Corporate image enhanced***

   The corporate image of the company will often be enhanced as a result of the prestige and public exposure of listing on the Stock Exchange. This can be important for consumer sales oriented companies. It is also significant for foreign companies as an offer of local participation is usually regarded most favourably by the host country. In addition, funding parties will generally look more favourably upon lending to listed companies due to the extent of reporting requirements and the controls placed upon listed companies by regulatory bodies.

5. ***Can attract and retain key personnel***

   The company may be in a better position to attract and retain key personnel by offering shares or options as part of their remuneration package.

6. In the case of a spin-off, it enables the newly floated company to stand on its own, independent of its former owner.

Disadvantages of public company listing

1. ***Dilution of control of existing owners***

   Existing owners face a weakening of control as an obvious consequence following public flotation. Depending on the extent of the dilution there is the possibility of a risk of takeover.

2. ***Additional responsibilities of directors***

   Directors of a public company assume additional responsibilities and are legally and morally obliged to act in the best interests of all shareholders. The company is no longer the private vehicle of the original owners and all transactions between the two must be on an arm's length basis.

3. ***Greater disclosure of information***

   An important consequence of listing is the greater demand for disclosure of information and its wider distribution. Disclosure requirements for public companies have increased in recent years and this trend will no doubt continue. Although fears are often expressed that disclosure of such financial information as sales, material contracts, sources of revenue and expense classifications will place the company at a competitive disadvantage, subsequent performance usually suggests that such fears are ill-founded.

4. ***Costs***

   There are explicit costs associated with a public flotation. These include the initial costs of conversion to a public listed company, underwriting fees and brokerage, accounting and legal fees, listing fees, share registry costs and other continuing expenses such as the increased cost of producing annual reports. In addition executives will need to allocate time to shareholder relations and meetings with security analysts.

5. ***Insider trading implications***

   The insider trading provisions of the *Corporations Law* have significant implications for shareholders connected with the company who may wish to deal in their shares.

A company must be of sufficient size, post-issue, to comply with the ASX listing requirements on capital structure. For an industrial company (as opposed to a mining and oil company) the minimum issued capital must be at least $1 000 000 with a minimum of 500 shareholders.

Secondary issues is the term used for all issues by a company subsequent to its listing. The principal forms of *secondary issues* are *private placements* and *rights issues.*

Private placements are issues of ordinary shares, preference shares or debt to clients of a sharebroker and/or institutional investors, such as life insurance companies, superannuation funds and investment companies. Prior to July 1987 private placements of ordinary shares could be made only to institutional investors; however, from that date issues of voting shares to brokers' clients were permitted under certain conditions. The main conditions are that the broker should recommend the shares to the clients, the discount on market price of the issue should not be excessive, and information on the activities of the company should be sent to all clients. Because of taxation arrangements, private placements of preference shares were very popular in the early 1980s; however, these advantages have disappeared with dividend imputation and the popularity has diminished.

Rights issues are also called *entitlement* or *pro rata issues.* When a rights issue is made, the shares are offered first to existing shareholders in proportion to their current shareholding. For example, if a 1 for 10 rights issue is made, the holder of 100 shares would be offered the right to 10 additional shares and the holder of 1900 shares would be offered the right to 190 shares.

The factors that will determine the terms of a rights issue are:

- the amount of funds required by the company;
- the market price of the issuing company's securities;
- the state of the share market and general economic conditions;
- the desire to provide a benefit to shareholders;
- the nature of the shareholders of the company—for example, a company with its shareholdings concentrated in the hands of a few investors would have to evaluate the support of those shareholders for the issues.

Table 17.1 Fixing the subscription price

		Previous twelve months				
	Current market price	*Lowest price*	*Highest price*	*Average price*	*Share price variance*	*Proposed subscription price*
Company A	5.00	2.00	10.00	5.30	3.00	4.50
Company B	5.00	4.00	6.00	5.30	1.00	4.50

Most companies seek to maintain the current rate of dividend per share on the increased number of shares after a rights issue although there is no economic reason for doing so. Therefore the 'cost' to the company is the increased dividend payout. The maximum issue price is determined by an assessment of what discount is necessary to ensure a high level of subscription. For an issue to be successful, the issue price (subscription price) must not be above the market price. A company that experiences substantial swings in the market price of its shares would have to fix a lower subscription price than a company whose share price is relatively constant.

Consider Company A and Company B in Table 17.1. If share prices are assumed to be distributed normally, there is a 40 per cent[1] chance that the market price of the shares of Company A will fall below the proposed subscription price, $4.50, and only a 20 per cent chance that the market price of the shares of Company B will fall below the subscription price. To ensure the success of the issue for Company A, the subscription price should be set below $4.50. If the firm wishes to have only a 20 per cent chance, the market price of Company A shares would fall below the subscription price; it would have to fix the price at $2.90

The discount on market price, which acts as the incentive to ensure the success of a rights issue, translates into a positive market value for the rights. If a shareholder does not wish to take up the rights, the rights could be sold for cash. Assume we have a 1 for 4 rights issue at a subscription price of $1.20 where the market price is $1.50. The theoretical rights price is provided by the formula:

where, $n\left(\frac{M-S}{n+r}\right)$

n = the number of shares held to obtain a right,

M = the market price,

S = the subscription or issue price of the rights issue,

r = the number of additional shares offered,

so that: $4\left(\frac{\$1.50 = \$1.20}{4+1}\right)$

= 24 cents

= the value of a right in the assumed issue

Under the *Corporations Law* there are difficulties in issuing shares at a discount to the paid-up value, and consequently a market price less than paid-up value can stop a rights issue as a source of equity funds. Rights issues can be either renounceable or non-renounceable. Most rights issues are renounceable as non-renounceable rights issues cannot be traded.

[*Tombstone*—An advertisement announcing completion of a public offering.]

Tombstone advertisements are used by underwriters after the issue is fully subscribed. They provide some information about the issue, and they list the underwriters who are involved with selling the issue. Tombstones appear after the event and are edged in black, hence the title 'tombstone'.

Note

1 Based on the characteristics of a normal distribution the following probabilities hold:

	Company A	Company B
Probability (share price < \$4.50)	.3936	.2119
Probability (\$5.30 > share price < \$4.50)	.1064	.2881

A world of financing options

Kath Walters

Source: Walters, K. 1999, A world of financing options', *Business Review Weekly,* 1 Mar., pp. 77–84.

Business loans, overdrafts, equity investors ... there are many sources of capital for companies looking to expand.

Small and medium-size companies looking for growth capital have a wider range of options than ever, but many find they cannot gain access to it. One source of funding that is growing in popularity for young companies is from private investors (business angels). Matchmaking services that introduce private investors to compatible business opportunities are established in most states, and have no shortage of investors.

Five innovation investment funds, licensed last year under a Federal Government initiative, are also targeting seed and early-stage firms. Record funds are flowing into venture-capital companies. Interest rates for debt funding are at their lowest for several years, and factoring finance is becoming more attractive in terms of cost and acceptability.

Most companies still prefer debt finance, according to Dr Tim Mazzarol, executive director of the small business unit of the Curtin Business School at the Curtin University of Technology in Perth. Company directors prefer to borrow rather than bring in an outside investor because they do not want to share control of their company. More than half the companies polled in 1995 for the Telstra Small Business Index used bank finance for growth.

Businesses should get funding from different sources depending on how the money is to be used, says Guy Bracher of Maclean & Patterson Consulting. 'Whenever I conduct a seminar I ask how many participants are funding growth out of their overdraft,' he says. 'I upset people when I tell them they will go out of business. Never fund long-term assets out of short-term finance. You try to match the funding to the asset.'

Mazzarol says the first place small businesses should look for extra cash is within their own operations. They might release enough cash to fund some growth plans by raising their prices a little in certain markets, cutting the cost of sales, or asking suppliers to drop their prices.

Bracher says companies that are too rigid about funding growth out of retained earnings or cashflow might miss opportunities. 'If they are looking to really grow a business, I think they are really kidding themselves. The whole thing is about getting the right mix of retained earnings, bank funding and equity.'

Mazzarol's view may be more realistic. Companies in Britain have been frightened away from bank finance since the recession and many are undercapitalised, according to Tim Atterton, executive director of the Small Business Centre at Durham University in England. In 1998 just 34% of start-ups used bank finance, compared with 80% six years before.

Management consultants agree that the attitude of the company founder is the key to gaining access to capital. 'There is now evidence based on good research to suggest that those with better-educated managers or teams are more likely to be among the top growers,' Mazzarol says.

Bracher adds: 'The mindset and belief systems of the person behind the business are the key things that investors will look at—their passion, their ability to make growth happen.'

Bracher believes companies with opportunity for growth should study different finance options, then ask their accountant to show them how to fund it correctly. Companies must understand their stage of growth. 'Banks don't fund start-ups. If you are early-stage, you have got to have hard assets or demonstrate cashflow or you won't get finance from banks,' he says.

The choice of funding sources is not limited to debt (banks) or equity (private investors or venture-capital companies). Other funding choices include joint ventures, strategic alliances, franchising or licensing, factoring and leasing, and business networks and incubators. A valuable summary of the pros and cons of debt, equity and other options will be available at the Small Business Victoria Web site on www.sbv.vic.gov.au from mid-March.

First, decide on your reasons for growth

Companies should be clear about why they want to grow, says Dr Tim Mazzarol, executive director of the small business unit of Perth's Curtin University of Technology. 'The reasons for growth will set the long-term direction, but many participants are not quite clear,' Mazzarol says.

Based on surveys of 50 participants in the programs over three years, growth motivations can be grouped into three categories: internal, external and altruistic. The need to achieve is one of the strongest internal motivators, along with financial security, personal challenge, improving lifestyle, and increasing overall wealth.

Growing to sell the business is among the external reasons. 'A caravan park owner used the program to grow his business, get a good price and buy a hotel,' Mazzarol says. Other external reasons include response to market pressure, taking advantage of an opportunity, or recognising that the company must either grow or die.

Although small and medium enterprises comprise the largest proportion of business in most economies and offer the greatest potential for job creation, altruistic reasons, including creating employment, were not high motivators, Mazzarol says.

Following are case studies of how three fast-growing companies used capital to expand

Fastway couriers

Bill McGowan's Fastway Couriers grew by 14 557% between 1993 and 1997. He launched the courier franchise in New Zealand in 1983 with $150 000 of his own money. Later, he raised $1 million from family and some senior employees, his accountant and his solicitor.

The company began in Australia in March 1993. He spent more than $1 million on market research funded from cashflow. McGowan says he does not make a profit on the sale of franchises; he recoups marketing and establishment costs. His returns come from taking a percentage of each franchisee's sales. He pioneered pre-paid courier vouchers, which produce good cashflow. 'I first introduced the concept in New Zealand. They said it could never be done. Now most of the industry operates that way.'

McGowan used $600 000 in bank finance to help buy his company's premises because it was a good investment and cheaper to own outright than to lease. McGowan's financial strategy has given the company stability. The downside is that shareholder returns have been low, but fortunately they are closely tied to the company.

He may expand into postal services if the sector is deregulated, and is considering all forms of capital, including finding another equity investor or forming a joint venture.

Multimedia technologies

Multimedia Technologies, a computer wholesaler, was founded in 1990 with $2000 contributed by partners Brent Crooks and John Hassall. Within 12 months, the company secured a small overdraft of $10 000, which later increased to $100 000. 'We seldom use the overdraft because we turn over our inventory a lot and that helps with cashflow,' says Crooks. The directors negotiated a line of credit of $500 000 to use for 'chance purchases' of stock. Otherwise, growth is funded through retained profits.

The company's turnover grew 3986% between 1993 and 1997 and is projected to reach $28 million this financial year. The company's growth strategy was guided by the two partners' determination to retain full control of the company. 'The company is solid financially,' says Crooks. 'I can go home happy at the end of the day.' He says he would consider taking on more partners or an equity investor if he and Hassall decided to take their company interstate.

Powerlan

In September 1992, Theo Baker set up his computer network sales and integration company, Powerlan, with $10 000 of his own money. Within three months, he had invested another $40 000.

He raised a bank overdraft of $30 000 with Westpac early on. As the business grew, he ran into difficulties with his bank manager. 'We were profitable, but our growth was rapid,' Baker says. 'They asked how we could sustain that. They deemed us as 'overtrading'. I must admit the bank branch was in the local shopping centre and dealing mainly with home mortgages. But the commercial banks weren't interested because we were too small for them.'

Baker changed banks and raised a $120 000 overdraft. At one point, he sold his house to raise $300 000 for a short-term (five months) cash injection into the business. 'My philosophy was to avoid bank finance because of the challenges with the bank.'

Later, he considered taking on an equity investor but changed his mind. He says he has a clear vision for the company and does not want to have to continually report back to an investor.

Baker says the only opportunities he has sacrificed are personal ones. However, he says that expanding interstate could not be funded from retained earnings alone because it would be too slow.

Lending arrangements take on a new variety

Debt Funding is one of the cheapest and most popular ways for small and medium business to raise capital. Company proprietors prefer it because they retain full ownership and control of their businesses. There are some very competitive lending rates available, and now is an ideal time for companies to review and compare products. 'There is about $20-billion worth of business lending out there paying rates in excess of 8%,' says Graham Jennings, head of business markets at Westpac.

Banks keep their margins and charges low by keeping the application processes simple and quick, and reducing loan management to a minimum compared with the processes used by equity investors.

The major disadvantage of debt funding is that companies cannot raise funds greater than the security they have to offer. Companies with complicated funding deals or emerging markets may need to look elsewhere, probably to private investors, who are prepared to spend time on due diligence and who take greater risks for much higher returns. Bank finance is ideal for an established, profitable company with good financial management.

Each of the major banks now has products that attempt to deal with a frequent complaint from business—that the banks are interested in lending only if the loan is secured by residential or commercial property. Hugh Harley, general manager of business customers for the Commonwealth Bank, says: 'Over the past couple of years, we have realised that the so-called softer assets, intellectual property, are likely to become much more important to businesses than traditional bricks and mortar.'

The new products are secured against cashflow, stock or debtors and can be operated from cards and cheque accounts with interest rates that are lower than overdrafts. Business development loans, at higher interest rates, are also available. Offering private assets, such as your home, as security will get you the lowest rate.

Haydn Park, spokesman for National Australia Bank, says that all bank lending is cashflow lending. 'If you have got a million-dollar property and no cashflow, we won't lend to your business. The secret is cashflow. The security side is the insurance policy.'

Factoring safeguards company cashflow

Big corporations in Britain and the US were shocked into revising their corporate strategies by the phenomenal growth of 'New Age' businesses such as Microsoft, according to Phil Ruthven, chairman of IBIS Business Information. Leasing instead of buying premises and equipment, and raising factoring finance against stock and debtors are among the new rules they set for themselves.

Ruthven says that in Australia the cost of factoring is about the same as the overdraft rate, about 9%. He says: 'People say to me, "That's a bit high because bill finance is nearer 6%". The answer is that 9% is hardly expensive when companies should be making nearer to 20% with their own capital.'

LAN Systems' turnover jumped from $4 million to $20 million in 1998. The company's founder, Scott Frew, was no longer able to fund the rapid growth of his computer wholesale business from retained earnings and cashflow. Instead of going to the bank, he turned to the factoring firm Scottish Pacific Business Finance because the arrangement was structured so that the finance grew (or shrank) with the size of his debtors ledger.

Under arrangements of this type, a company is authorised to borrow up to an agreed proportion of its current debtors ledger, commonly about 80%. As the ledger grows, so does the size of the authorised finance. The authorisations are based on the invoices issued by the company, and the agreed proportion of each account is usually available 24 hours after submission of the invoice. The company's clients pay their bills direct to the factoring firm, and not until then does the factoring firm pass on the balance to the company that raised the invoices. The factoring firm's earnings come from collection fees on each invoice.

Invoice discounting is similar to factoring, but is based on paper values in which the company itself carries the responsibility for collecting the debt. This means that although the arrangement costs less and helps cashflow, the company is more vulnerable to the effects of bad debts and slow payers.

Factoring can be extended to many types of financial arrangements. One example is given by Brendan Green, NSW state manager for business development with Scottish Pacific Business Finance. 'Labor hire companies are among our biggest customers. They may be providing staff for a client on a three-month contract. The staff have to be paid every week, but the client is paying a bulk amount at the end of the contract.'

A new entrant in the market, GE Capital, sees itself as a specialised financier, and not in direct competition with the banks, according to Michael Donnelly, its chief financial officer. GE provides plant and equipment finance, fleet management, inventory and receivables financing, and insurance premium funding.

Using venture capital to build a business

Equity Finance can increase the funds available for growth by up to 100%, according to Tim Atterton, executive director of the Small Business Centre at Durham University in England. 'Quite simply, the fastest growers are those with the funds available. I would recommend equity every time. I don't think there is anything that doesn't demonstrate it.'

An equity investor takes a share in a growing company and contributes capital and skills to help it develop. After a negotiated period, the investor withdraws from the deal under an agreed plan of settlement. Broadly speaking, there are three sources of equity capital: venture-capital companies, the Federal Government's innovation investment funds, and private equity investors sometimes known as business angels.

It can take years to build a solid capital base from retained earnings. Atterton says: 'With equity, you can increase your capital base by 100% in the first year. You are going to leap forward, aren't you?'

A great deal of effort has been put into building up the private-capital market in Britain, but most businesses there reject the idea of receiving equity investment because they do not want to share their control. But it has been shown time and time again that their anxieties disappear when they accept a suitable equity partner. Atterton says: 'As soon as that person is on board, they think it is the best thing that ever happened. They change their mind immediately because they have access to a broader perspective.'

Equity investment can also help companies to gain debt finance. 'It is very reassuring to a lender like us,' says Haydn Park, a spokesman for the National Australia Bank. 'It shows there has been enormous analysis of the business. Anybody who is prepared to put up capital and wait a number of years to get a return won't do that on the back of an envelope.'

Surveys of Australia's venture-capital companies show that most of their money is invested in rapidly expanding companies, usually with markets overseas, or in companies that management teams want to buy out.

To get money from venture-capital companies, it is important to understand their funding cycle, says management consultant, Guy Bracher from Maclean & Patterson Consulting. The funds usually operate on a 10-year cycle. The first three years are spent investing, from three to seven years is spent consolidating investments, which might include second rounds of funding to some investee companies, and the last three years is spent withdrawing from the investments, by trade sale or by listing on a stock exchange. 'The earlier in the cycle businesses approach the venture-capital company, the more likely you are to get startup funding,' Bracher says.

Venture-capital companies do not generally invest in seed and start-up companies, although the reasons for this are not well understood. The Federal Government's strategy with its innovation investment funds is to reduce the risk involved in funding very young companies. The Government granted five innovation investment fund licences to venture-capital companies willing to seek out and fund companies at the seed, start-up and early expansion stage. Every dollar raised from private investors is matched by two from the Government, and the private investors will keep 90% of the profits from investments. The Government has set aside $130 million for the scheme.

All but one of the funds is off to a slow start. Three received their licences in March last year. One of them is the Sydney-based A&B Investments, which specialises in information technology and telecommunications companies, and has made seven investments. It is by far the most active of any innovation investment fund. Rothschild Bioscience Managers, specialising in innovative bioscience technologies, has made one investment. AMWIN, a generalist fund, has made two investments. The other two funds, Coates Myer & Company and Momentum Funds Management, received their licences in November. Neither has yet made an investment.

In Australia, the private capital market is young. Bracher is optimistic about its potential. He says: 'If we can get the development of the market right, we will have created a huge pool of money that people can gain relatively easy access to. And the process of getting the money can transform small and medium-sized businesses in this country. All the investor really wants to know is whether you have a good business. Do you have knowledge and hard data about your market? How big is the market and how fast is it growing? Who are the main participants in the market? What is your sustainable competitive advantage?'

Angels will invest in companies at the seed and start-up stage, or in established companies launching a new product or moving into the global marketplace. They almost always take a hands-on role in the investee company, usually at a strategic rather than day-to-day level, bringing marketing, financial and management skills to assist the company in its growth and expansion.

Investors register with equity matchmaking services who introduce them to businesses that match their investment criteria. There are about a dozen in Australia. Some were launched through business chambers and are run on a non-profit basis. 'There is no shortage of private investors,' Bracher says. 'The problem is to find companies with good management that are well-prepared financially and offer investors an attractive deal.'

Financial leverage and capital structure

Topic 9

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Introduction

Imagine you have some good friends who are quite well off and that they have $1 million of equity capital invested in their business and have allowed their business to borrow $1 million of long-term debt. Imagine also that they come to you (because they know you're studying for a postgraduate qualification in management) and ask you whether the mix of debt and equity in their business is the optimal mix or whether they should in some way change the proportions of debt and equity. They know that in after-tax terms, debt funds are cheaper than equity funds and they wonder whether there may be advantages in employing more debt. What advice would you give them?

This mix of debt and equity is, as you already know, called a capital structure, and it is often measured by a debt-to-equity ratio. The questions of how much debt or equity is right for a business or whether there is an optimal capital structure for businesses are some of the most controversial issues in finance. We begin by discussing these two questions theoretically, using the thoughts of two Nobel prize winners in economics, Franco Modigliani and Merton Miller (M&M).

We relax some of the assumptions made by M&M and develop a model which suggests that debt funds are cheaper than equity funds (because of the tax deductibility of the interest) and when judiciously combined may decrease the overall cost of capital for a firm and hence increase the value of that firm. The firm, we suggest, should be careful, however, not to borrow too much because of the possibility of becoming bankrupt.

We will also provide some information on capital structures in practice for various industries.

Tandy's prudent use of financial leverage benefits shareholders

To survive, a business must remain profitable. A business must invest in assets and finance these investments. To sustain profitability, assets must return a rate which is greater than the cost of funds that finance these assets. Successful businesses apply this principle in choosing their investments and financing methods.

One company that has done this is the Tandy Corporation. Tandy has used financial leverage to fund its investment in assets whose returns far exceed the firm's financing costs. Tandy's prudent use of debt has effectively lowered the firm's overall financing costs and increased the return to its shareholders. Over a 10-year period, Tandy was able to increase its return on equity from around 12 per cent to 40 per cent per annum. Tandy Corporation recognised that not only does a firm have to select the assets in which to invest, the firm must also choose financing methods that can improve the return to its shareholders.

Source: Gitman et al. 1998, p. 449.

Objectives

At the completion of this topic you should be able to:

- define the terms 'optimal capital structure' and 'target capital structure';
- calculate return on equity and earnings per share at various levels of earnings before interest and taxes;
- explain the concept of homemade leverage to create or undo a company's financially leveraged position.
- understand that, in a world with company taxes, the interest tax shield provided by borrowing funds can decrease the WACC and, hence, the value of the firm can be increased;
- describe the capital structures of various industries;
- calculate ratios such as times interest earned (TIE) and debt-service coverage (DSC); and
- outline the importance of knowing how investment analysts and lenders might react to capital structure.

Learning resources

Textbook

Ross, S.A., Westerfield, R.W. & Jordan, B.D. 2000
Fundamentals of Corporate Finance
5th edn, Irwin McGraw-Hill, Boston, chapter 16.

Readings

Retkwa, R. 1993
'Building optimal capital structures that can support a tasty future'
Corporate Cashflow
vol. 14, no. 13, Dec., pp. 15–18.

Van Horne, J. et al. 1995
'Cash-flow ability to service debt'
Financial Management and Policy in Australia,
4th edn, Prentice Hall, Sydney, pp. 538–41.

Van Horne, J. et al.1995
'Other methods of analysis'
Financial Management and Policy in Australia,
4th edn, Prentice Hall, Sydney, pp. 542–5.

Key concepts

The following key concepts are introduced and developed in this topic:

- optimal capital structure;
- financial leverage;
- EBIT-EPS graph;
- business risk;
- financial risk;
- bankruptcy costs;
- financial distress;
- times interest earned; and
- debt service coverage

The capital structure question

The basic question in this topic is 'how should a firm go about choosing its debt-to-equity ratio so that it can maximise the value of the firm to its owners?'. This simple question, as you will soon see, doesn't have such a simple answer.

Reading

Please read the introduction to Chapter 16 and 'The capital structure question' (Section 16.1) in Ross et al. 2000, pp. 485–7. You should note the following points:

- **the expression 'capital restructuring' means changing the debt-to-equity ratio (p. 485);**
- **the three possible scenarios in the event of a capital restructure are given in the example (pp. 486–7);**
- **there is a need to study the weighted average cost of capital of a firm, because if the weighted cost of capital can be minimised (which also means the discount rate can be minimised), then the value of the firms cash flows can be maximised and hence the value of the firm can be maximised (p. 487); and**
- **the expression 'optimal capital structure' (also called a target capital structure) represents a debt-to-equity ratio that provides the lowest possible weighted average cost of capital (p. 487).**

The effect of financial leverage

Financial leverage refers to the company's reliance on debt. The higher the reliance on debt (also called gearing), the higher the financial leverage. The lower the reliance on debt, the lower the financial leverage. In this section we discuss whether the increased use of debt affects the weighted average cost of capital (WACC). If it decreases the WACC, then the extra reliance on debt will be beneficial and more debt should be raised. If, on the other hand, the extra reliance on debt actually increases the WACC (or doesn't alter it), then there is no need for the increased debt.

Reading

Please read 'The effect of financial leverage' (Section 16.2) in Ross et al. 2000, pp. 487–92. You should note the following points:

- **the Trans Am example shows a company starting off as a no-debt firm, then borrowing to return the equity capital to the existing shareholders, leaving the firm with a debt–equity ratio of 1 (p. 488);**
- **note how to calculate the return on equity (ROE) and earnings per share (EPS) for Trans Am under its 'no debt' state and its 'debt-to-equity state of 1' at various levels of earnings before interest and taxes (pp. 488–9);**
- **note the impact that leverage has on the ROE and EPS as a result of the restructuring and how gains or losses can be magnified by financial leverage (p. 489);**
- **the EBIT–EPS graph highlights the magnification of gains and losses as a result of financial leverage (pp. 489–90);**
- **the basic conclusions regarding financial leverage at Trans Am (p. 491) could be:**
- **when EBIT is high, financial leverage magnifies earnings per share and return on equity;**
- **under the expected scenario, leverage increases the expected EPS and ROE from the original 'no debt' position;**
- **shareholders are exposed to more risk with financial leverage; and**
- **as financial leverage can impact on both the expected return to stockholders and on the riskiness of the return to shareholders, the capital structure decision is an important one.**
- **homemade leverage can be used to alter the amount of financial leverage that is borne by individual investors and even though a firm may choose not to borrow, an individual shareholder may borrow and create their own financial leverage and hence magnification of gains and losses (pp. 491–2); and**
- **an individual investor may choose a 'no debt' position even though a company may have borrowed. To do this the investor sells stock in the company and lends out the proceeds (p. 492).**

You should have picked up on two things that may not sit easy with you presently. First, that the investor needs to be able to borrow at the same interest rate as the company can borrow at. Second, that the investor who wants to undo the leverage created by the company must be able to lend (and earn interest on their deposit funds) at the same rate as the borrowing rate of the company. Bear with us for a little longer and do not dismiss the discussion as unuseable theory because of these two issues.

Exercise 9.1

Attempt 'Chapter review and self-test problem' 16.1 (p. 515), 'Concepts review and critical thinking questions' 5 and 6 (p. 516) and 'Questions and problems' 1, 2, 3, 4, 6, and 8 (pp. 517–8) in Ross et al. 2000.

Capital structure and the cost of equity capital

Franco Modigliani and Merton Miller (M&M) are two Nobel prize winners in economics who advanced the proposition that the capital structure of a firm is unimportant, and that a firm cannot increase its value by changing its debt-to-equity ratio. Given the idea of homemade leverage, this appears to be the case. Let us pursue their arguments a little further.

Reading

Please read 'Capital structure and the cost of equity capital' (Section 16.3) in Ross et al. 2000, pp. 493–6. You should note:

- **M&M Proposition suggests that the value of a firm could well be the value of the assets owned by the firm. If the value of these assets (and of the debt and equity which funded those assets) is represented by a 'pie' model, it would not matter how the debt and equity were divided, the size of the pie would remain the same (p. 493).**
- **If company taxes are ignored, the market value of the firm is basically reliant on the earning power and the risk of the underlying assets owned by the firm. Given this premise, the cost of equity capital would rise to offset any possible gains caused by the company using cheaper debt funding so that the WACC would remain constant at any debt-to-equity ratio (pp. 493–5 and particularly Figure 16.3).**
- **The risk inherent in a firm's operations is its business risk and the greater the business risk, the greater the required rate of return on those assets owned by the firm. Further, the greater the required rate of return on the assets, the greater the required rate of return by the equity providers (p. 496).**
- **Financial risk arises from the use of debt funding and the more debt the greater the financial risk. Further, the more financial risk, the higher the required rate of return by the equity providers (p. 496).**

Please remember that we are talking about a theoretical world of no company taxes.

Exercise 9.2

Attempt 'Chapter review and self-test problem' 16.2 (p. 515), and 'Concepts review and critical thinking question' 1 (p. 516) in Ross et al. 2000.

M&M Propositions I and II with company taxes and bankruptcy costs

Let us now relax the theoretical model of M&M Propositions I and II and allow companies to pay taxes and claim tax deductions on the interest paid on borrowed funds. The tax deductibility of interest is a valuable benefit to companies but with borrowings also comes the risk of failure (or bankruptcy). The discussion in the next section focuses on the tax deductibility of interest and the possibility of bankruptcy because of excessive borrowings.

Reading

Please read 'M&M Propositions I and II with corporate taxes' (Section 16.4) and 'Bankruptcy costs' (Section 16.5) in Ross et al. 2000, pp. 496–503. You should note:

- **interest paid on borrowings reduces the taxable income but the cash flow from the assets is higher because of the interest providing a tax shield (pp. 497–8);**
- **the value of a levered firm is higher than the value of an unlevered firm by the present value of the interest tax shield (pp. 498–9);**
- **the value of an unlevered firm is equal to the EBIT multiplied by 1 minus the tax rate, all divided by the unlevered cost of capital (the cost of capital where a firm has no debt) (p. 499). (You might recall the perpetuity formula that you encountered in Topic 3.);**
- **regrettably this approach leads companies to want to borrow to fund all their assets—this is an unlikely real-world position (p. 499);**
- **a factor that will lead companies to limit their borrowings is the prospect of bankruptcy (p. 502);**
- **there are direct bankruptcy costs such as legal, accounting and other administrative expenses (p. 502);**
- **the costs of avoiding bankruptcy incurred by financially distressed firms are called indirect bankruptcy costs (p. 503); and**
- **financial distress costs are both the direct and indirect bankruptcy costs, and it is basically these costs that limit the amount of debt that firms will choose to use (p. 503).**

You will not need to remember formulae 16.1–4 for the end-of-semester examination. You should, however, have a good grasp of figures 16.2–5 that illustrate the basics of the messages of M&M.

Exercise 9.3

Attempt 'Chapter review and self-test problem' 16.3 (p. 515), and 'Questions and problems' 10, 11 and 14 (pp. 518–9) in Ross et al. 2000.

Optimal capital structure

So far we have established that an interest tax shield is valuable in that it reduces the pre-tax cost of debt and therefore reduces the WACC. We have also established that companies may be able to borrow low levels of debt without a great fear of financial distress. As the level of debt grows, however, the possibility of financial distress also grows. Given these findings, the optimal capital structure for most companies is likely to be some debt but not so much debt that the benefit caused by the debt funding is outweighed by the financial distress costs.

Financial risk sinks Ariadne

In the mid-1980s, Ariadne was one of the high-flying entrepreneurial companies listed on the Australian Stock Exchange. The company was heavily involved in share market trading, which provided a large portion of its operating cash flow. The value of Ariadne was consequently dependent on the value of the stock it traded and the cash flow this activity provided. Ariadne was so successful that its share price increased from around $0.30 when the company was first listed in early 1983, to a high of over $3.80 in early 1987. Following the world stock market decline in October 1987, the value of the stocks held by Ariadne fell dramatically and Ariadne's cash flow suffered accordingly. Ariadne was unable to service its loans and was faced with a huge debt. At that time the company owed in excess of $1 billion to 31 banks. Ariadne took a mauling, with its share price dropping to around $0.60 in December 1987. Because of the high financial risk created by its heavy reliance on financial leverage, Ariadne was on the verge of bankruptcy when the firm lost its ability to service its loans. The banks agreed to the establishment of a task force and allowed Ariadne to continue operating under an asset rationalisation and debt repayment program. In 1988, Ariadne reported a record loss at that time for an Australian company of $640 million. Ariadne continued to operate under the task force arrangements, but by August 1992 its share price had fallen to $0.02 and trading was suspended at the request of the company. The financial risk from debt had taken its toll and Ariadne had become just a mere shadow of its former self.

Source: Gitman et al. 1998, p. 486.

Reading

Read 'Optimal capital structure' (Section 16.6) and 'The pie again' (Section 16.7) in Ross et al. 2000, pp. 503–10. You should note:

- **the static theory of capital structure suggests that 'firms borrow up to the point where the tax benefit from an extra dollar in debt is exactly equal to the cost that comes from the increased probability of financial distress' (pp. 503–5 and Figure 16.6);**

- **the optimal capital structure is the one that maximises the value of the firm and minimises the WACC (pp. 505–6 and Figure 16.7). Note how the WACC, which is a mixture of the after-tax cost of debt and the cost of equity, goes down initially (which is due to the cheaper after-tax cost of debt). Note then how the WACC goes up to reflect the financial distress costs (which are due to the increase in the after-tax cost of debt and the increase in the cost of equity, which reflect the worries of the debt and equity providers);**

- **note how the optimal capital structure theoretically exists at Point D* in Figure 16.8 reflecting the optimal level of debt and at Point D*/E* reflecting the optimal debt-to-equity ratio (pp. 506–7);**

- **firms relying on the benefit of the interest tax shield should be in a tax-paying position (pp. 506–8);**
- **firms with a greater risk of financial distress are likely to borrow less than those with a lower risk of financial distress. Also note that firms with lower distress costs are likely to be able to borrow more than those whose financial distress costs are higher (p. 508); and**
- **the basic goal of the firm using the extended pie model is to minimise the tax and bankruptcy claims on the firm's cash flows (pp. 508–10).**

Observed capital structures in the USA

We have discussed the theory behind an optimal capital structure but how are firms managing their mix of debt and equity in practice? Do high tax paying companies utilise a lot of debt to take advantage of the interest tax shield? Do companies in similar lines of business with the same operating risks and asset types have similar debt-to-equity ratios (as the theory suggests they should)?

Reading

Please read 'Observed capital structures' (Section 16.8) in Ross et al. 2000, pp. 510–11. You should note:

- **the seemingly low debt-to-equity ratios of many publicly listed corporations in the USA (pp. 510–11);**
- **cable television and electric utility companies are the only ones relying on more debt capital than equity capital (pp. 510–11);**
- **some very high tax paying companies such as drug and computer companies rely much more heavily on equity than debt (pp. 510–11); and**
- **companies are generally not raising enormous amounts of debt to the point where tax shelters are totally used up, and that they are in some way influenced by the costs of financial distress (pp. 510–11).**

Exercise 9.4

Attempt 'Concepts review and critical thinking questions' 2, 4 and 10 in Ross et al. 2000, pp. 516–7.

Analysing the possibility of financial distress

We have spoken generally about financial distress costs but we haven't really been able to give much specific advice so far to companies wishing to borrow (or to the debt providers how they might consider the possibility of default). The next section discusses some specific tools that a finance manager might use in grappling with the problem of the possibility of financial distress.

Cash-flow ability to service debt

The ability or inability of a firm to service its debt is critical in determining an appropriate capital structure. Quite clearly, a firm with a high capacity to service its debt can borrow more while a firm that is unable to service its debt must borrow nothing. You will study some ratios in the next section that may help in your determination of the firm's ability to service its debt obligation.

Reading

Please read Van Horne et al. 1995, 'Cash flow ability to service debt'. You should note:

- **how to calculate the 'times interest earned' and debt-service coverage ratios; and**
- **the probability of cash insolvency and how cash budgets can help managers manage their finances.**

Exercise 9.5

Complete the following problem. Boehm-Gau Real Estate Speculators P/L and the Northern Territory Gas Co. Ltd have the following EBIT and debt-servicing burden:

	Boehm-Gau	**Northern Territory Gas Co.**
Expected EBIT	**$5 000 000**	**$100 000 000**
Annual interest	**1 600 000**	**45 000 000**
Annual principal payments on debt	**2 000 000**	**35 000 000**

The tax rate is 33%. Compute the interest coverage and the debt-service coverage ratios for the two companies. With which company would you feel comfortable if you were a lender?

Source: Van Horne et al. 1995, p. 552.

Comparison of capital structure ratios and surveying debt and equity providers

In addition to the quantitative methods you have looked at above regarding the appropriateness of a firm's capital structure, we should consider some generally accepted industry standards. You might note that Australian industries tend to have a greater reliance on debt funding than US industries. The reason for this is not entirely clear. Researchers often find different debt-to-equity results in different countries and sometimes even different results in the same country where different time periods for the data are explored.

Reading

Please read Van Horne et al 1995,, 'Other methods of analysis'. You should note:

- **the importance of noting industry ratios; and**
- **the importance of talking to and listening to investment analysts, lenders, security ratings agencies and, of course, investors.**

(Note also that you cannot really make definitive statements about the similarities or differences between industries, or between firms within industries, from simply looking at the ratios, especially when the ratios have been derived from book value rather than market value figures.)

Exercise 9.6

Complete the following problem.

The debt ratios of four companies are:

Company	**Total debt/total assets**	**Long-term debt/total capitalisation***
A	.56	.43
B	.64	.66
C	.47	.08
D	.42	.26

*** Note: Total capitalisation represents all long-term debt plus shareholders' equity.**

The companies are part of the following industries: supermarkets, chemical, apparel making and airline (not in order). Match the company with its most likely industry.

Source: Van Horne et al. 1995, p. 552.

Reading

Please read Retkwa 1993, 'Building optimal capital structures that can support a tasty future' to understand the importance of a firm's capacity to service debt. The reading demonstrates some of the financial distress problems of Chrysler in the USA. Detailed note-taking is not necessary.

Exercise 9.7

Find out how much debt and equity your firm employs in its capital structure. Ask the appropriate people why that mix of debt and equity is employed. Perform an EBIT–EPS analysis and times interest earned (or debt-service coverage) calculation for the most recent year's figures and then try to forecast your firm's EBIT–EPS and TIE (or DSC) for the following year. Are you satisfied with your firm's results? Why?

Summary

In this topic we have noted that the optimal capital structure for a firm is one that minimises the WACC. Assuming that homemade leverage can be employed by investors and that company taxes and financial distress costs are ignored, then M&M have proven that there is no optimal capital structure. They suggest that the basic question of there being an optimal mix of debt and equity for a firm is irrelevant.

If we relax the above assumptions then the way a firm finances its business assets is very relevant. We discussed that the tax deductibility of interest provides a very important tax shield to companies and allows them to reduce their WACC. We also noted, however, that companies can't borrow 'too much' because of financial distress costs and that these may outweigh the benefits of using the cheaper debt funding. We concluded the theoretical discussion by saying that an optimal capital structure exists where the net saving from an additional dollar of interest equals the increase in the expected financial distress costs.

We looked at various capital structures of industries in the USA and in Australia, and recognised that understanding these capital structures is important if for no other reason than that the suppliers of debt and equity capital regard them as being important.

We also noted that companies should really use a combination of tools in determining an appropriate capital structure. These tools are essentially tools to help determine a company's ability to service its debt obligations and not suffer financial distress costs. These tools include EBIT–EPS analysis, times interest earned and debt-service coverage ratios, comparing capital structure ratios to other companies of similar business risk, and asking investment analysts and lenders for their thoughts.

Regrettably there is no one model that has been developed that categorically indicates a firm's optimal capital structure. As there are so many factors that affect and influence capital structure, the best we can do at this stage is to review the issues above and come up with an informed and well-reasoned business judgment.

Review question

Read the following case study and complete the questions following.

Review question 9.1

Case study: Capital reconstruction of Bathurst Bricks Ltd

Background

Mr James Brickie, managing director of Bathurst Bricks Ltd, suspects that his company is being stalked by takeover raiders. An executive of Exceptional Corporate Advisers, a leading advisory company, visits him and leaves a proposition for a capital reconstruction which involves returning cash to shareholders and taking on additional debt. The recommendation reads as follows:

Mr James Brickie
Managing Director
Bathurst Bricks Ltd
Bathurst NSW

Dear Mr Brickie,

re: CAPITAL RECONSTRUCTION PROPOSAL

We recommend a capital reconstruction of Bathurst Bricks as a way of creating shareholder value by increasing the share price and thereby reducing the possibility of a takeover at less than the full value price. Such a reconstruction would involve returning between 50 cents and $1.00 cash to shareholders for each share they are presently entitled to. Such a return would consist of a return of 25 cents from paid-up capital and between 25 cents and 75 cents from the share premium reserve. Subsequent to this capital reconstruction, we recommend the consolidation of the remaining shares. This would result in two shares of 25 cents each being consolidated into one share of 50 cents.

The funds required for the reconstruction would be borrowed, thereby increasing the leverage of Bathurst Bricks. This will reduce the potential for an acquiring company to fund its acquisition of Bathurst bricks from debt borrowed against Bathurst Bricks' assets and cash flows.

The reconstruction has the further benefits of

- using a cheaper funding method due to the differential cost of debt and equity, and the tax deductibility of interest;
- not diluting the current owners' interests in the company; and
- not introducing any potentially destabilising influence to the share registry.

In general the reconstruction will increase earnings per share on a lower share base. We demonstrate the balance-sheet and profit-and-loss effects of such a reconstruction below. The gearing and other balance-sheet effects and the earnings-per-share and other income-statement effects are separately shown for the three possible reconstruction scenarios as follows:

- Scenario 1: 50 cents cash (25 cents of capital and 25 cents of premium) per 50 cent ordinary share.
- Scenario 2: 75 cents cash (25 cents of capital and 50 cents of premium) per 50 cent ordinary share.
- Scenario 3: $1.00 cash (25 cents of capital and 75 cents of premium) per 50 cent ordinary share.

Effect of capital reconstruction on debt/equity

	30/6/X1	Scenario 1	Scenario 2	Scenario 3
	$'000	$'000	$'000	$'000
Debt				
– Current	2324	2324	2324	2324
– Non current	8495	8495	8495	8495
– New	–	47 216	70 824	94 433
	10 810	58 035	81 643	105 252
Equity				
– Issued capital	47 216[1]	23 608[2]	23 608[2]	23 608[2]
– Reserves				
– Share premium	84 005	60 397	36 389	13 180
– Capital	18 277	18 277	18 277	18 277
	102 282	78 674	54 666	31 457
– Retained profits	46 731	46 731	46 731	46 731
– Minority shareholders	9140	9140	9140	9140
	205 369	158 153	134 145	110 936
Debt/equity ratio	5.3%	36.7%	60.7%	94.9%

Notes: [1] Issued capital at 30/6/X1 was 94 432 520 ordinary shares of 50 cents.
[2] Issued capital post reconstruction is 47 216 260 ordinary shares of 50 cents.

Effect of capital reconstruction on debt/equity

	30/6/X1	Scenario 1	Scenario 2	Scenario 3
	$'000	$'000	$'000	$'000
EBIT @ 30/6/X1	29 879	29 879	29 879	29 879
Interest expense (old debt)	1618	1618	1618	1618
Interest expense (new debt)		7082	10 624	14 165
	28 261	21 179	17 637	14 096
Income tax expense @ 33%	9326	6989	5820	4652
Profit after tax	18 935	14 190	11 817	9444
EPS (cents)	20.1	30.1	25.0	20.0

Bathurst Bricks pre-reconstruction share price is approximately $4.15 and its pre-reconstruction price/earnings multiple is approximately 20.6. The value of a shareholding in Bathurst Bricks post-reconstruction depends on which of the above scenarios is adopted and the effect of the increased gearing on the price/earnings multiple. The latter requires more detailed analysis which is beyond the scope of this letter. Empirical evidence suggests that the above capital reconstructions improve total shareholder value. If you would like me to elaborate on any of these points please do not hesitate to call me.

Yours sincerely
I. M. Wise
Director

Required

As Financial Manager, Mr Brickie has asked you to evaluate the proposal put forward by Exceptional Corporate Advisers. He says, 'I would like to see an EPS–EBIT analysis (including a chart) of the scenarios they put forward. Our current EBIT is $29 879 000 but what would happen if we went to $50 million, or fell to $10 million? What other observations can you make about the proposal?'

Source: Van Horne et al. 1995, pp. 553–5.

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Suggested answers

Topic 9

Exercises

Concepts review and critical thinking questions

Exercise 9.1

5. It's called leverage (or 'gearing' in the UK) because it magnifies gains or losses.

6. Homemade leverage refers to the use of borrowing on the personal level as opposed to the corporate level.

Questions and problems

1.

(a)

EBIT:	$1600	$4000	$5200
Interest:	0	0	0
NI:	$1600	$4000	$5200
EPS:	$0.80	$2.00	$2.60
ΔEPS%	– 60	–	+ 30

(b) MV $80 000 / 2000 shares = $40 per share; $35 000 / $40 = 875 shares bought back

EBIT:	$1600	$4000	$5200
Interest:	1750	1750	1750
NI:	$ – 150	$2250	$3450
EPS:	– 0.13	2.00	$3.07
ΔEPS%	– 106.50	–	+ 53.50

2.

(a)

EBIT:	$1600	$4000	$5200
Interest:	0	0	0
Taxes:	560	1400	1820
NI:	$1040	$2600	$3380
EPS:	$0.52	$1.30	$1.69
ΔEPS%	– 60	–	+ 30

(b) MV \$80 000 / 2000 shares = \$40 per share; \$35 000 / \$40 = 875 shares bought back

EBIT:	\$1600	\$4000	\$5200
Interest:	1750	1750	1750
Taxes:	+ 52.50	787.50	1207.50
NI:	– \$97.50	\$1462.50	\$2242.50
EPS:	\$ – 0.087	\$1.30	\$1.99
ΔEPS%	– 106.69	–	+ 53.08

3.

(a) Market-to-book ratio = 1.0, so TE = MV = \$80 000; ROE = NI / \$80 000

ROE:	.02	.05	.065
ΔROE%	– 60	–	+ 30

(b) TE = \$80 000 – \$35 000 = \$45 000; ROE = NI / \$45 000

ROE:	– .0033	.0500	.0767
ΔROE%	– 106.60	–	+ 53.33

(c)

No debt, ROE:	.0130	.0325	.0423
ΔROE%	– 60	–	+ 30
With debt, ROE:	.00217	.0325	.04983
ΔROE%	– 106.67	–	+ 53.33

4.

(a) Plan I: NI = \$600K;
EPS = \$600K / 200K shares = \$3.00
Plan II: NI = \$600K – .10(\$4M) = \$200K;
EPS = \$200K / 100K shares = \$2.00
Plan I has the higher EPS when EBIT is \$600 000

(b) Plan I: NI = \$2.5M;
EPS = \$2M / 200K shares = \$12.50
Plan II: NI = \$2.5M – .10(\$4M) = \$2.1M;
EPS = \$2.5M / 100K shares = \$21.00
Plan II has the higher EPS when EBIT is \$2 500 000.

(c) EBIT/200K = [EBIT – .10(\$4M)] / 100K; EBIT = \$800 000

6.

(a)

	I	*II*	*All-equity*
EBIT:	\$6000	\$6000	\$6000
Interest:	1540	770	0
NI:	\$4460	\$5230	\$6000
EPS:	\$5.58	\$5.81	\$6.00

The all-equity plan has the highest EPS; Plan I has the lowest EPS.

(b) Plan I vs. all-equity: EBIT / 1000 = [EBIT – .11(\$14 000)] / 800; EBIT = \$7700
Plan II vs. all-equity: EBIT / 1000 = [EBIT – .11(\$7000)] / 900; EBIT = \$7700
The break-even levels of EBIT are the same because of M&M Proposition I.

(c) [EBIT – .11(\$14 000)] / 800 = [EBIT – .11(\$7000)] / 900; EBIT = \$7700
This break-even level of EBIT is the same as in part (b) again because of M&M Proposition I.

(d)

	I	*II*	*All-equity*
EBIT:	$5000	$5000	$5000
Interest:	1540	770	0
Taxes:	1315	1607	1900
NI:	$2145	$2623	$3100
EPS:	$2.68	$2.91	$3.10

The all-equity plan still has the highest EPS; Plan I still has the lowest EPS.
Plan I vs. all-equity: EBIT(.62) / 1000 = [EBIT – .11($14 000](.62) / 800;
EBIT = $7700
Plan II vs. all-equity: EBIT(.62) / 1000 = [EBIT – .11($7000](.62) / 900;
EBIT = $7700
[EBIT – .11($14 000)](.62) / 800 = [EBIT – .11($7000)](.62) / 900;
EBIT = $7700

The break-even levels of EBIT do not change because the addition of taxes reduces the income of all three plans by the same percentage; therefore, they do not change relative to one another.

8.

(a) EPS = $3000 / 500 shares = $6.00; Tipper's cash flow = $6.00(100 shares) = $600

(b) V = $65(500) = $32 500; D = 0.40($32 500) = $13 000
$13 000 / $65 = 200 shares are bought; NI = $3000 – .07($13 000) = $2090
EPS = $2090 / 300 shares = $6.97; Tipper's cash flow = $6.97(100 shares) = $696.67

(c) Sell 40 shares of stock and lend the proceeds at 7%; interest cash flow = 40($65)(.07) = $182 cash flow from shares held = $6.97(60 shares) = $418; total cash flow = $600.

(d) The capital structure is irrelevant because shareholders can create their own leverage or unlever the stock to create the payoff they desire, regardless of the capital structure the firm actually chooses.

Exercise 9.2

1. Business risk is the equity risk arising from the nature of the firm's operating activity, and is directly related to the systematic risk of the firm's assets. Financial risk is the equity risk that is due entirely to the firm's chosen capital structure. As financial leverage, or the use of debt financing, increases, so does financial risk and hence the overall risk of the equity. Thus, Firm B could have a higher cost of equity if it uses greater leverage.

Exercise 9.3

10. V = EBIT / WACC; EBIT = .12($25M) = $3M

11. $V = V_U + T_C D$; V = EBIT (.66) / .12 + 0; EBIT = $4.545M, WACC = 12%

Due to taxes, EBIT for an all-equity firm would have to be higher for the firm to still be worth $25M.

14. $V = V_U$ = $60 000(.65) / .22 = $177 272.73
$V = V_U + T_C D$ = $177 272.73 + .35($25 000) = $186 022.73

Exercise 9.4

2. No, it doesn't follow. While it is true that the equity and debt costs are rising, the key thing to remember is that the cost of debt is still less than the cost of equity. Since we are using more and more debt, the WACC does not necessarily rise.

4. The more capital intensive industries, such as airlines, cable television and electric utilities, tend to use greater financial leverage. Also, industries with less predictable future earnings, such as computer or drugs, tend to use less. Such industries also have a higher concentration of growth and start-up firms. Overall, the general tendency is for firms with identifiable, tangible assets and relatively more predictable future earnings to use more debt financing. These are typically the firms with the greatest need for external financing and the greatest likelihood of benefiting from the interest tax shelter.

10. The basic goal is to minimise the value of nonmarketed claims.

Exercise 9.5

(000s omitted)

Boehm-Gau: Interest coverage = \$5000 / \$1600 = 3.13

Debt-service Coverage

$$= \frac{\$5000}{\$1600 + \dfrac{\$2000}{(1-.33)}} = 1.09$$

Northern Territory: Interest coverage = \$100 000 / \$45 000 = 2.22

Debt-service Coverage

$$= \frac{\$100\,000}{\$45\,000 + \dfrac{\$35\,000}{(1-.33)}} = 1.028$$

The question of with which company one feels more comfortable depends on the business risk. Inasmuch as a gas utility has stable cash flow and Northern Territory is large, it is no doubt the safer loan despite the lower coverage ratios.

Exercise 9.6

Matching, we get:

Company	*TD/TA*	*LTD/Total Cap.*	*Industry*
A	.56	.43	Chemical
B	.64	.66	Airline
C	.47	.08	Supermarket
D	.42	.26	Apparel maker

The supermarket is likely to have the highest portion of total debt in the form of accounts payable, a short-term liability, because purchases make up a large portion of total costs. Therefore, we would expect it to have the greatest disparity between the two debt ratios. The airline would be expected to have the highest debt ratio, most of which is long-term debt used to finance aircraft. Here the ratio of total debt to total assets is slightly less than the ratio of long-term debt to total capitalisation. An apparel maker will have a sizeable amount of accounts payable, but will also have some long-term debt used to finance fixed assets. Finally, the chemical company is determined largely by elimination. Such a company has current liabilities, but relies heavily on long-term debt to finance fixed assets.

Review question

Review question 9.1

Case study: Bathurst Bricks Ltd

The answers for EPS under the current structure and scenarios 1, 2 and 3 at the alternative EBIT levels of $10 million and $50 million are presented below. A chart representing the results is also shown.

The more aggressive gearing levels suggested by the advisers will produce higher EPS results (relative to the current situation) as long as EBIT remains above 25 million. The current EBIT of the company is only approximately $30 million. Thus, a relatively small downturn in building activity could present a significant reduction in EPS compared to the result which would occur under the current gearing structure. By asking for calculations at an EBIT range of $10–$20 million, the managing director was testing realistic ranges for the company. The managing director might feel that such an event would do more to attract a takeover bidder than the current 'undergeared' structure.

Another matter which has not been raised by the advisers is the question of risk, credit rating and the cost of debt. The change in gearing could result in a downgrading of the company's debt and a consequent rise in the interest rate. In that case the assumption of a constant interest rate irrespective of the level of gearing, as has been done by the adviser, may not hold. If the interest rate did rise, this would create an even greater sensitivity for the firm. This could be confirmed by changing the interest rate in the spreadsheet.

Finally, the fact that EPS will be enhanced with an increase in gearing and maintenance of the current EBIT does not necessarily mean that the value of the shares will rise, making it more difficult (expensive) for a potential bidder. This is because the quality of the underlying cash flow stream to equity holders will be lowered by the increase in gearing. The building industry is highly cyclical, which suggests that gearing levels may need to be kept low. With dividend imputation there is less chance of a large tax shield arising from the use of debt. If this is the case, the best way of avoiding an unwanted bid will be to ensure that there are no inefficiencies which can be exploited by a bidder.

Assumptions:

EBIT (your choice)	$50 000	$50 000	$50 000	$50 000
Annual interest paid (*I*)	$1618	$7082	$10 624	$14 165
Annual preference dividend paid (*PD*)	0	0	0	0
Tax rate (*t*)	33%	33%	33%	33%
Number of ordinary shares (*NS*)	94 432	47 216	47 216	47 216
EPS =	$0.343	$0.609	$0.559	$0.509

Bathurst Bricks Ltd

		Current ($000)	Scenario 1 ($000)	Scenario 2 ($000)	Scenario 3 ($000)
EBIT		29 879	29 879	29 879	29 879
less, interest expense (old)		1618	1618	1618	1618
less, interest on new debt			7082	10 624	14 165
		28 261	21 179	17 637	14 096
Income tax @ 33%	0.33	9326	6989	5820	4652
Profit after tax		18 935	14 190	11 817	9444
Ordinary shares		94 432	47 216	47 216	47 216
Earnings per share (EPS)		0.201	0.301	0.250	0.200
Interest cover		18.5	3.4	2.4	1.9
Interest rate		0.15	0.15	0.15	0.15
New debt ($000)			47 216	70 824	94 433

EBIT–EPS analysis

Instructions: Follow steps by inserting variables.

Step 1: Find EPS at a given EBIT level.

Assumptions:

EBIT (your choice)	$10 000	$10 000	$10 000	$10 000
Annual interest paid (*I*)	$1618	$7082	$10 624	$14 165
Annual preference dividend paid (*PD*)	0	0	0	0
Tax rate (*t*)	33%	33%	33%	33%
Number of ordinary shares (*NS*)	94 432	47 216	47 216	47 216
EPS =	$0.059	$0.041	($0.009)	($0.059)

Step 2: Find EBIT for EPS = 0

EBIT (0) = (EBIT – 1)	– 1618	– 7082.4	– 10 623.6	– 14 164.95
× (1 – *t*)	0.67	0.67	0.67	0.67
– *PD*	0	0	0	0
EBIT (0) =	1618	7082.4	10 623.6	14 164.95

Building optimal capital structures that can support a tasty future

Rosalyn Retkwa

Source: Retkwa, R. 1993, 'Building optimal capital structures that can support a tasty future', *Corporate Cashflow,* vol. 14, no. 13, Dec., pp. 15–18.

Confronted with low rates and a strong market for corporate securities of almost any type, financial chiefs are busy building the ideal capital structure, skillfully fitting together blocks of debt and equity. Some consensus seems to be emerging that the optimally leveraged company is likely to be among the single-A rated. Meanwhile, the distinction between debt and equity has been blurred by the continuing flood of exotic hybrid securities. Although it never went through the leveraged buyout wringer, Chrysler Corp. provides a good example of the bounce-back capital rebuilding strategy. Rating agencies have become more sophisticated in their analysis of debt. Now debt is measured by qualitative factors as well as quantity. While many companies are choosing to take on more leverage to grow their businesses, some are counting on off-balance-sheet financing. A strong market has encouraged companies to experiment with things they might not have attempted before. One convert is Salomon Brothers' dividend-enhanced convertible stock.

Confronted with low rates and a strong market for corporate securities of almost any type, financial chiefs are busy building the ideal capital structure, skillfully fitting together selected blocks of debt and equity.

The perfect palace of capital is a mythical site, of course, but shrewd decisions now could pay off in a vital competitive edge for years to come.

Corporate America is emerging from its love/hate relationship with leverage and settling on cool calculation. Debt no longer carries the stigma it did in 1990, and a triple-A rating no longer conveys a halo.

'There is a perception that somewhat more leverage is manageable. Large industrial companies no longer feel there's a stigma attached to having some leverage,' observes Stan O'Neal, a managing director at Merrill Lynch & Co. in New York City.

Some consensus seems to be emerging that the optimally leveraged company is likely to be among the single-A rated. Any more debt and a company is paying too much for capital and endangering its future access to the markets. Any less debt and shareholders might be penalized with a reduced return on equity.

Especially in a tight market, the very narrow spreads between triple-A, double-A and single-A rates may not justify the sacrifice on the leverage side. Indeed, as of October 22, the average differential between a single-A, 10-year corporate bond and its triple-A counterpart was only 23 basis points—6.07% versus 5.84%. On 30-year corporates, the average spread was 24 bps—6.82% versus 6.58%.

At the same time, the parameters have expanded for what constitutes an acceptable debt level in any of the investment-grade categories. That's because cash flow, rather than debt-to-total-capital, has become the dominant measure.

Flurry of hybrids

Meanwhile, the distinction between debt and equity has been blurred by the continuing flood of exotic hybrid securities.

'You would think that, with interest rates as low as they are, most companies would choose plain vanilla debt,' says Sol Samson, head of the rating policy committee at the Standard & Poor's Corp. in New York City. 'But investment banks pay people to come up with innovative ideas,' he says, and the last six to eight months have seen a sudden surge of requests for opinions on how S&P would view a particular hybrid structure.

Everyone is searching for the perfect security that 'would be viewed as equity by the marketplace and the rating agencies but as debt by the IRS' to get the tax advantage, he says.

On the low end of the credit spectrum, companies still are struggling to work their way out of highly leveraged balance sheets by raising as much equity as possible and decreasing debt, intent on making it back to the investment-grade ranks, with all that implies in terms of access to capital and lower financing costs.

What Chrysler did

Although it never went through the leveraged buyout wringer, automotive giant Chrysler Corp. provides a good example of the bounce-back capital rebuilding strategy. Chrysler's best-ever third quarter earnings of $423 million, more than double the $202 million booked a year earlier, continues a remarkable turnaround story that started in 1989 when the faltering giant first realized that the auto business was heading into a severe downturn.

Sales were slipping, and 'incentives and costly marketing programs were eroding margins,' recalls Thomas P. Capo, the Detroit-based firm's vice president and treasurer. Chrysler executives decided that its capital structure would have to be rebuilt, not just to survive the down cycle but to position itself for the next up cycle.

'We wanted to come out of the recession with the products that would allow us to enjoy the good times,' he says. This time, product development would be protected from the belt tightening. The battle would be to raise cash and cut costs elsewhere, he explains.

Nonstrategic businesses went on the block. Gulfstream Aerospace went for $820 million. Sale of its shares in Mitsubishi Motors Corp. brought in $813 million. The sale of DiamondStar Motors Corp. raised another $100 million. Chrysler Financial Corp., the financing subsidiary, sold its 'Chrysler First' division that was engaged in non-auto consumer lending.

Chrysler also set its sights on cutting and supplied both savings and incentives with its 'bet your check' program. Managers 'bet' 5% to 10% of their paychecks that Chrysler would meet its target of $1 billion a year in cost savings. If it did, the company would give them double their money back.

That campaign was a smashing success, Mr. Capo says; 'more than $3 billion' was saved between 1989 and 1991, and another $1.5 billion in costs were cut in 1992. 'That plan got us through the recession and positioned us to enjoy good product acceptance and sales,' he concludes.

But by 1991, Chrysler was booking a $1.1 billion operating loss, and it slipped from the lowest rung of investment-grade (triple-B) to a non-investment-grade single-B. Cash flow was a negative $78 million. Chrysler Financial, largely frozen out of the investment-grade capital markets (it retained access to the securitized auto loan market), was forced to fall back on its bank facilities—at a steep differential. 'Going to the banks cost us approximately 200 basis points more,' Mr. Capo says.

By 1992, with sales improving, the focus shifted to fixing the balance sheet. 'We wanted financial stability, increased liquidity and uninterrupted access to the capital markets,' Mr. Capo says.

Regaining its investment-grade rating was crucial, and it had to be a 'solid rating, good enough to withstand cyclical downturns in the future,' he says. Chrysler also had a huge unfunded pension liability that would reach $3.9 billion by the end of 1992.

Rebuilding equity

Therefore, it began rebuilding equity in September 1991 with the first of three major stock offerings that together put $3.5 billion of fresh equity capital on its books. In that first offering, Chrysler sold $400 million of stock to the public and contributed $300 million of stock to its pension plan at $10 a share.

In February 1992, it sold $800 million of convertible preferred to the public. Having just done a common stock offering six months earlier, Chrysler wanted 'to access a different group of investors,' Mr. Capo explains. Then, in February 1993, Chrysler did its third offering—$2 billion of common, priced at $38.75 a share.

While Chrysler was bolstering equity, it also was cutting debt, from $4.4 billion at the end of 1991 to $2.7 billion as of mid-November of this year, when it called $800 million of debt, Mr. Capo says.

Chrysler finally won back its investment-grade status this year (from Fitch in May, Moody's in September and S&P in October), but 'the capital markets began to sense the recovery of Chrysler and Chrysler Financial in late 1992,' Mr. Capo says.

Chrysler Financial started a series of bond deals in December 1992 that, to date, has raised $1.6 billion in term debt. As its financial condition improved, it reentered both the commercial paper and medium-term note markets, Mr. Capo notes. Its CP program is back up to $2.5 billion, and MTNs have brought in $450 million.

Term debt is important, Mr. Capo says, because Chrysler Financial needs to match fund long-term liabilities—its consumer car loans, which range from three to seven years. Fixed-rate debt means 'not being subject to swings in interest rates,' he notes.

Recovering creditworthiness in the public capital markets has rescued Chrysler Financial from the ravages of bank credit. On Sept. 30, 1992, its bank borrowings stood at $6.1 billion. One year later, that number had dropped all the way down to 'below $200 million,' he says. (Parent Chrysler Corp. did not draw on its bank lines during the downturn, he adds.)

Predictably, Chrysler's debt-to-cap ratio has improved considerably—from 59% at the end of 1991, to 21% last September, excluding the onetime, non-cash charge for post-retirement health benefits. And the automaker has contributed $2.6 billion in cash to its pension fund this year, Mr. Capo says.

The stock it gave the plan in 1991 at $10 a share was worth $51.75 on the day Chrysler released its third-quarter '93 results. That will go a long way toward closing the gap, but not as much as it could have outside managers hired by the pension fund 'sold some of the stock along the way,' Mr. Capo explains.

Chrysler's cash balance has grown from $3 billion at year-end 1992 to $4.4 billion by the end of [1993's] third quarter, Mr. Capo notes. More may be coming. The consensus on Wall Street is that Chrysler will earn $5.20 a share on a fully diluted basis [in 1993], versus $2.21 in 1992. Wall Street also expects the dividend, cut from 30 cents a share to 15 cents in April 1991, to be increased soon.

'Our objective has been to build a strong balance sheet. We think we're well on our way to accomplishing that,' he says.

Mr. Capo has two more goals. He wants to climb one more rung up the investment-grade ladder to 'at least a single-A rating,' and he wants to build a 'cash hoard' of $5 billion from retained earnings before the next down cycle hits, to protect product development into the future.

Is single-A optimal?

Rating agencies have become more sophisticated in their analysis of debt. Now debt is measured by qualitative factors as well as quantity. More weight is given to 'intangibles'—a company's relative size and stability and the true value of its assets. More and more, investment-grade companies are gaining leeway to take on additional leverage without risking a downgrade.

For instance, Standard & Poor's now relies on a matrix. The debt-to-cap ratio is only one benchmark used to delineate the company's business risk profile, Mr. Samson says.

To get an S&P single-A rating, a company can have a debt-to-cap ratio as low as 30% or as high as 50%, depending on whether it comes up as just 'average' or 'excellent' in S&P's risk-scoring system. An 'excellent' single-A credit would enjoy 'a very strong competitive position, with a business that could be characterized as relatively stable,' he says.

For double-A, debt can range between 25% and 40% of total capital, while it takes 20–30% to qualify for a triple-A, he adds. 'The less the business risk, the more financial risk a company can afford, to come out at the same place,' he explains.

Robert J. Grossman, executive vice president at Fitch Investors Service Inc., New York, makes the same point—that qualitative factors affect debt capacity. Intangibles can make the acceptable level of debt for a single-A company go up to 35% or down to 25%, he says.

With debt standards more limber, both Mr. Samson and Mr. Grossman note a trend for the issuer to 'converge' on the neighborhood of the single-A rating. 'For the average industrial company, single-A is probably the most efficient place to be; triple-A is just too expensive,' says Mr. Grossman. Single-A is the cutoff for most institutional bond buyers, he notes.

Fingerhut's asset securitization

While many companies are choosing to take on more leverage to grow their businesses, some companies are counting on off-balance-sheet financing. One of them is Fingerhut Companies Inc., Minnetonka, MN, a catalogue retailer that sells to moderate-income households on the installment plan.

Fingerhut, part of American Can Co. when that company was bought by Primerica Corp., was spun off by Primerica in a series of four public stock offerings between April 1990 and December 1992. Fingerhut now has a market capitalization of roughly $1.4 billion. Its shares, first offered at $16.50, were selling recently for the equivalent of $60.50, unadjusted for the effects of a recent 2-for-1 split, notes Daniel McAthie, the firm's vice president and treasurer.

Earnings through the third quarter of this year—$1.171 billion—were up 15%.

Fingerhut started life with a balance sheet heavy in equity and with almost no debt. But its rapidly growing business has generated a mountain of accounts receivable to be funded, leaving the company to 'rely heavily on off-balance-sheet financing,' Mr. McAthie notes. Roughly two-thirds of its receivables are sold to three bank-sponsored special purpose corporations for securitization.

When Fingerhut took its first steps away from dependence on Primerica's 'bank' in 1990, it negotiated a $40-million revolving credit facility. Recently Fingerhut negotiated a $250-million revolver with a syndicate agented by Chemical Bank, he adds.

Since its independence, Fingerhut also has completed $245 million in private placement MTNs, rated via private letter ruling. The firm still has no publicly rated debt. Debt-to-cap now falls in the moderate 33–34% range.

Proceeds were used to fund continuing development of sophisticated customer database systems and to build more warehouses and other facilities, Mr. McAthie explains.

'I don't see us leveraging the company significantly from our present levels unless we do a major acquisition,' he says.

Instead, Fingerhut is planning to upgrade its receivables-based financing, graduating from the bank SPCs to its own master trust issuing mechanism by the middle of 1994. That is becoming 'economically feasible' because Fingerhut's total receivables are now approaching $1 billion, he says.

The master trust will 'let us do public as well as private debt,' Mr. McAthie says. Over time, there might be cost savings, but the goal is to give Fingerhut 'more flexibility' and make the firm less reliant on the appetite' of the SPCs for its paper. 'Ultimately, it will be nice when we can move our own independent, totally unsecured commercial paper program,' he says.

Cash flow vs. book value

Raters depend more on cash flow than the debt-to-cap ratio because the latter relies heavily on book value numbers. Book value 'is not a particularly meaningful number anymore,' says Mr. Grossman of Fitch.

Book value 'does not take inflation into account,' he notes, leading to a lot of undervalued assets. The Coca-Cola trademark, carried on the books at $1, is a flagrant example. Steel mills and real estate are likewise recorded at amounts far below their true market value.

At the same time, changes in accounting conventions are adding liabilities to the balance sheet and depleting equity, even though no economic change has ocurred.

The FASB ruling on post-retirement health benefits has, in some cases, resulted in huge, non-cash charges.

Chrysler is a case in point. Even though the automaker has added $3.5 billion in new equity to its balance sheet since 1991, it also had to take a one-time non-cash charge of $4.7 billion against its equity for retiree health benefits this year.

The point of putting more liabilities on the books is to 'get a better handle on what the liabilities are,' says Thomas W. Hoens, a senior vice president in Fitch's industrial ratings group. But the result, he notes, is that 'the assets are understated: the liabilities are a guesstimate, and the equity becomes more and more meaningless.'

Using cash flow to gauge creditworthiness gained acceptance in The LBO years, Mr. Grossman notes, because 'debt-to-cap was particularly irrelevant for highly leveraged companies, given the fact that many of them had negative net worth.' The focus on cash flow coverage now is trickling up into the lower rungs of the investment-grade ranks, he says.

Another junk-bond discipline that has not gotten much attention is liability structure. 'When companies were predominately AA or AAA, and there was an assumption that they could finance at any time, companies didn't pay that much attention to when their debt was coming due,' he says.

'We feel it's important that companies actively manage their liabilities as well as their assets, and that means spreading out debt maturities,' he continues.

Convertible bond bonanza

Meanwhile, the hybrid securities market has surged, fueled in large part by investor demand. Issuers can get 'good pricing, good product structuring and flexibility,' says Peter B. Blanton, an investment banker on the equity capital markets desk at Salomon Brothers in New York City.

With the stock market at record highs and interest rates at near-record lows, convertible bonds are a popular defensive play, giving investors a yield that is higher than the dividend on the common, but the right to convert to shares of stock if the market continues to rise, he explains.

The convertible market has grown to $100 billion in estimated outstandings, up from $50 billion just three or four years ago. Roughly $18 billion has been issued this year, he notes.

Companies like converts since yields have declined significantly, he continues. Over the last three years, the rate on a typical 10-year, triple-B convertible has declined roughly 275 basis points, to the 5 1/4% level, 'and a lot of deals are getting done at 4% or 5%, depending on the credit and the story on the dividend yield on the underlying common,' he says.

Much of the convertible paper is being purchased by growth and income or equity income mutual funds since converts are 'one of the better-yielding instruments,' he points out. That demand has pushed conversion premiums 'a little bit higher' than they were—24% or 25%, versus 20% or 22% three years ago—he says, so many companies now are able to sell paper with higher strike prices.

Such a strong market has encouraged companies to experiment with 'things they might not have attempted before' that go beyond 'the traditional garden-variety structure,' says Mr. Blanton.

MascoTech's backdoor equity

Among the converts is Salomon Brothers' DECS (dividend-enhanced convertible stock). Salomon underwrote its first DECS deal last summer for MascoTech Inc., a $1.7-billion (annual sales) plumbing and construction supplies business located in Taylor, MI.

MascoTech issued mandatory convertible preferred-bonds that automatically convert to stock at the end of four years if they're not called sooner. The $200 million raised in the offering counts as equity on the balance immediately, notes John Morgan of Morgan, Lewis, Githens & Ahn, the New York investment banking boutique that acted as the firm's financial advisor on the deal.

MascoTech was highly leveraged. Prior to the DECS offering, it had $1.247 billion of long-term debt on its books, with a long-term debt to total cap ratio of 77.6%, says the Salomon banker who worked on the deal. Using the offering proceeds to repay debt brought the ratio down to 65.6%, he reports. The company, he adds, is shooting for an investment-grade rating.

While MascoTech needed to increase equity, it couldn't use straight common, Mr. Morgan says, because of its thin float. Less than half of the 51 million shares outstanding are in public hands, and the average daily float is just 110 000 shares.

Selling another 10 million shares of straight common would have given 'the short sellers too much of an opportunity to play around with us,' he says, as well as cause serious dilution, probably dropping the share price from $20 to the $16–18 range.

With the DECS issue, because of the mandatory convert, they got something that 'counts as straight equity' on the balance sheet now. By the time the issue converts after four years, 'we can ease it into the market, without any market effects,' Mr. Morgan says.

Because of its equity status, the issue doesn't have the tax advantages of debt, he adds.

'Companies are experimenting with non-traditional forms of equity,' says Mr. Grossman of Fitch. 'They're asking, "Is there a more efficient way to raise equity?" because equity can be extremely expensive.'

Ratings and converts

Adds Harold H. Goldberg, chairman of Moody's corporate rating committee: 'The issue is the perception of the rating agency as to how much equity content a given security might have.'

First, Moody's would look to see whether the conversion is mandatory and 'not at the discretion of the issuer or even the investor.' That is 'by far the most important criteria' in determining equity content, he says. Next, Moody's looks at the expected date of conversion—the sooner the better, he says.

‘Another consideration is the overall credit capacity of the issuer, and the general frame of mind is: the higher the rating the higher the equity content of the security,’ he says, explaining: ‘if you know this will be a viable enterprise on into the future, the mandatory exchange future, then you can attribute a higher equity content to the security.’

Mr. Grossman adds, ‘We don’t mind seeing some [preferreds or converts] … but there’s a limit, usually based on coverage ratios.’

The question is not what your coverage ratio is today but what it would be under stressful circumstances. ‘A single-A or triple-B credit should have a reasonable margin for error, if its basic business slows down,’ he says.

After turbulent times in the 1970s and 1980s forced treasury managers to become balance sheet contortionists, the early 1990s are providing an open season for rebuilding the capital structure and providing the cost, flexibility and access that their companies can cash in on in the future.

Cash-flow ability to service debt

J. Van Horne et al.

Source: Van Horne, J., Wachowicz, J., Davis, K. & Lawriwsky, M. 1995, *Financial Management and Policy in Australia,* 4th edn, Prentice Hall, Sydney, pp. 538–41.

When trying to determine the appropriate financial leverage for a company, we would also analyse the cash-flow ability of the company to service fixed financial charges. The greater the dollar amount of senior securities that the company issues and the shorter their maturity, the greater the fixed financial charges of the company. These charges include principal and interest payments on debt, financial lease payments and preference share dividends. Before taking on additional fixed financial charges, the company should analyse its expected future cash flows, because fixed financial charges must be met with cash. The inability to meet these charges, with the exception of preference share dividends, may result in financial insolvency. The greater and more stable the expected future cash flows of the company, the greater the debt capacity of the company.

Coverage ratios

One of the ways in which we can gain knowledge about the debt capacity of a company is through an analysis of coverage ratios. These ratios … are designed to relate the financial charges of a company to the company's ability to service, or cover, them. In the computation of these ratios, one typically uses earnings before interest and taxes as a rough measure of the cash flow available to cover fixed financial charges. Perhaps the most widely used coverage ratio is the interest coverage ratio (or times interest earned). This ratio is simply earnings before interest and taxes for a particular period divided by interest charges for the period:

$$\begin{array}{c}\text{Interest coverage}\\ \text{(or times interest earned)}\end{array} = \frac{\begin{array}{c}\text{Earnings before interest}\\ \text{and tax (EBIT)}\end{array}}{\text{Interest expense}} \qquad \textbf{(14.19)}$$

Suppose, for example, that the most recent annual earnings before interest and taxes for a company were \$6 million and annual interest payments on all debt obligations were \$1.5 million. Then, EBIT would 'cover' interest charges 4 times. This tells us that EBIT can drop by as much as 75 per cent and the company will still be able to cover the current level of interest-payments out of earnings.

An interest-coverage ratio of 1 indicates that earnings are just sufficient to satisfy the interest burden. Generalisations about what is a proper interest coverage ratio are inappropriate unless reference is made to the type of business in which the company is engaged. In a highly stable business, a relatively low interest-coverage ratio may be appropriate, whereas it may not be appropriate in a highly cyclical business.

Note that the interest-coverage ratio tells us nothing about the company's ability to meet principal on its debts. The inability to meet a principal payment constitutes the same legal default as failure to meet an interest payment. Therefore, it is useful to compute the coverage ratio for the full debt-service burden. This ratio is:

$$\text{Debt-service coverage} = \frac{\text{Earnings before interest and tax (EBIT)}}{\text{Interest expense} + \text{Principal payments}/(1 - \text{Tax rate})} \qquad \textbf{(14.20)}$$

Here principal payments are adjusted upward for the tax effect. The reason is that EBIT represents earnings before tax. Because principal payments are not deductible for tax purposes, they must be paid out of after-tax earnings. Therefore, we must adjust principal payments so that they are consistent with EBIT. If principal payments in our previous example were \$1 million per annum and the tax rate were 40 per cent, the debt-service coverage ratio would be:

$$\text{Debt-service coverage} = \frac{\$4 \text{ million}}{\$1.5 \text{ million} + \$1 \text{ million}/(1-.40)} = 1.26$$

A coverage ratio of 1.26 means that EBIT can fall by only 21 per cent before earnings coverage is insufficient to service the debt. Obviously, the closer the debt-service coverage ratio is to 1, the worse things are, all other things being the same. However, even with this coverage ratio being less than 1, a company may still be able to meet its obligations if it can renew some of its debt when principal comes due or if assets are sold.

Part of the overall analysis of the financial risk associated with financial leverage should focus on the company's ability to service total fixed charges. While lease financing is not debt *per se,* its impact on cash flows is exactly the same as the payment of interest and principal on a debt obligation. (See Chapter 19 for an analysis of lease financing.) Annual financial lease payments, therefore, should be added to the numerator and denominator of equation (14.20) in order to properly reflect the total cash-flow burden associated with financing.

In certain industries even more specific measures of coverage may need to be devised in order to overcome the problems encountered in making comparisons between companies. For example, in the airline industry alternative depreciation policies can have a marked effect on the size of EBIT. To place such companies on a comparable footing it is preferable to calculate earnings before depreciation interest and tax. However, this adjustment is not sufficient in light of sizeable variations between airlines in the degree of reliance on financial and operating leases. To counter these effects we would need to calculate earnings before depreciation, lease rentals, interest and tax (EBDRIT), and relate this to interest plus lease rental expenses. The effect of alternative treatments can make a dramatic difference to the perceived coverage, as displayed below:

	Coverage	
	EBDIT/interest expense	EBDRIT/interest + lease rental expense
British Airways (BA)	5.23	2.12
Japan Air Lines (JAL)	4.97	4.97

Source: K. Murphy and C.Y. Lim '1991 and 1992 earnings models', *Global Aviation Quarterly,* Morgan Stanley (New York and Hong Kong), 2 June 1992.

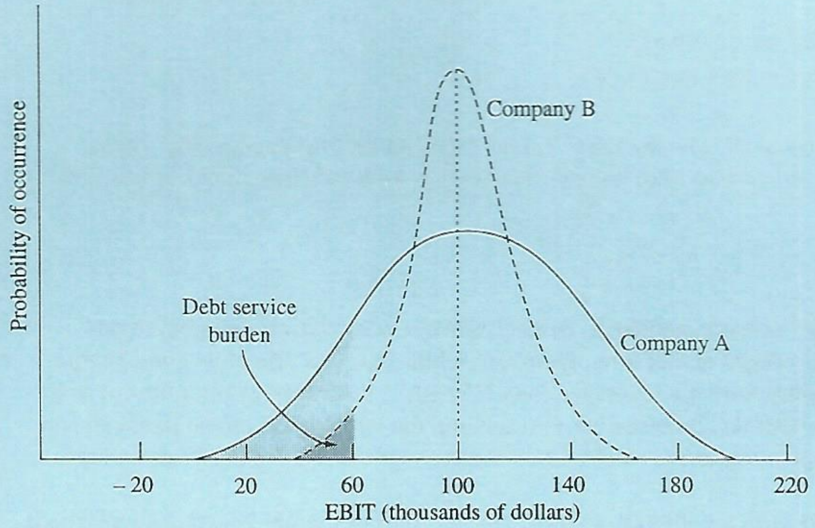
By industry standards, British Airways was relatively conservatively leveraged at that time. However, while JAL was effectively much more conservatively leveraged than BA, this is not apparent from the coverage of EBDIT. After taking into account the rentals paid on the financial and operating leases of BA a better picture of the relative positions emerges.

As with the interest-coverage ratio, 'rules of thumb' generalisations about what constitutes a good or bad debt-service ratio are often inappropriate. What constitutes a good or bad ratio varies according to the business risk of the company. This fact is illustrated in Figure 14.5, which shows the probability distributions of EBIT for two hypothetical companies. The expected value of EBIT is the same for both companies, as is the debt-service burden as described by the denominator in equation (14.20). Therefore, the debt-service coverage ratios are also the same, namely \$100 000/\$60 000 = 1.67. Company A, however, has much more business risk as shown in the greater variability of its EBIT. The probability that EBIT will fall below the debt-service burden is depicted by the shaded areas in the figure. We see that this probability is much greater for Company A than it is for Company B. While a debt-service coverage ratio of 1.67 may be appropriate for Company B, it may not be appropriate for Company A. Simply put, a company with stable cash flows is better able to take on relatively more fixed charges.

Two comparisons should be undertaken when analysing a coverage ratio. First, it should be compared with past and expected future ratios of the same company. Called trend analysis, the comparison determines if there has been an improvement or deterioration in coverage over time. The second comparison is with similar companies, generally in the same industry. The idea here is to try to isolate business risk as accurately as possible by comparing like companies.

Ultimately, one wants to make generalisations about the appropriate amount of debt (and leases) for a company to have in its financing mix. As the ability of a company to service debt over the long run is clearly tied to earnings, coverage ratios are an important tool of analysis. However, they are but one tool by which a person is able to reach conclusions with respect to determining an appropriate financing mix for the company. Coverage ratios, like all ratios, are subject to certain limitations and, consequently, cannot be used as a sole means for determining a company's financing. The fact that EBIT falls below the debt-service burden does not spell immediate doom for the company. Often alternative sources of funds, including renewal of the loan, are available and these sources must be considered.

Figure 14.5: Possible EBITs for companies A and B in relation to their debt-service burdens



Probability of cash insolvency

The vital question for the company is not so much whether a coverage ratio will fall below 1 but rather: What are the chances of cash insolvency? Fixed charge financing adds to the company's danger of cash insolvency. Therefore, the answer depends on whether all sources of payment—earnings, cash, a new financing arrangement or the sale of assets—are collectively deficient. A coverage ratio tells only part of the story. To address the broad question of cash insolvency, we must obtain information on the possible deviation of actual cash flows from those that are expected. Cash budgets can be prepared for a range of possible outcomes, with a probability attached to each outcome. This information is extremely valuable to the financial manager in evaluating the ability of the company to meet fixed obligations. Not only expected earnings are taken into account in determining this ability, but other cash-flow factors as well—such as, the purchase or sale of assets, the liquidity of the company, dividend payments and seasonal patterns. Given the probabilities of particular cash-flow sequences, the financial manager is able to determine the amount of fixed financing charges the company can undertake while still remaining within insolvency limits tolerable to management.

Management may feel that a 5 per cent probability of being out of cash is the maximum that it can tolerate and that this probability corresponds to a cash budget prepared under pessimistic assumptions. In this case, debt might be undertaken up to the point where the cash balance under the pessimistic cash budget is just sufficient to cover the fixed charges associated with the debt. In other words, debt would be increased to the point at which the additional cash drain would cause the probability of cash insolvency to equal the risk tolerance specified by management. Note that the method of analysis simply provides a means for assessing the effect of increases in debt on the risk of cash insolvency. On the basis of this information, management would arrive at the most appropriate level of debt.

The analysis of the cash-flow ability of the company to service fixed financial charges is perhaps the best way to analyse financial risk, but there is a real question as to whether all (or most) of the participants in the financial markets analyse a company in this manner. Sophisticated lenders and institutional investors certainly analyse the amount of fixed financial charges and evaluate financial risk in keeping with the ability of the company to service these charges. However, individual investors may judge financial risk more by book-value proportions of debt and equity. There may or may not be a reasonable correspondence between the ratio of debt to equity and the amount of fixed charges relative to the company's cash-flow ability to service these charges. Some companies may have relatively high ratios of debt to equity but substantial cash-flow ability to service debt. Consequently, the analysis of debt-to-equity ratios alone can be deceiving, and an analysis of the magnitude and stability of cash flows relative to fixed financial charges is extremely important in determining the appropriate financing mix for the company.

Other methods of analysis

J. Van Horne et al.

Source: Van Horne, J., Wachowicz, J., Davis, K. & Lawriwsky, M. 1995, *Financial Management and Policy in Australia,* 4th edn, Prentice Hall, Sydney, pp. 542–5.

Comparison of capital structure ratios

Another method of analysing the appropriate financing mix for a company is to evaluate the capital structure of other companies having similar business risk. Companies used in this comparison are most often those in the same industry. If the company is contemplating a capital structure significantly out of line with that of similar companies, it is conspicuous in the marketplace. This is not to say that the company is wrong. Other companies in the industry may be too conservative in their use of debt. The optimal capital structure for all companies in the industry might call for a higher proportion of debt to equity than the industry average. As a result, the company may be able to justify more debt than the industry average. If the company's financial leverage is noticeably out of line in either direction, it should be prepared to justify its position, because investment analysts and creditors tend to evaluate companies by industry.

There are wide variations in the use of financial leverage across business companies. A good deal of the variation is removed, however, if one groups companies by industry classification, because there is a tendency for the companies in an industry to cluster when it comes to debt ratios. For selected industries, the debt-to-net worth ratios for a recent period looked as shown in Table 14.5.

Whereas developers and contractors do not employ much financial leverage, transport and media companies make extensive use of debt in financing projects. The nature of an organisation's industry will drive, to a certain extent, its capital structure, so, when making capital structure comparisons, look at other companies in the same industry. In short, compare apples with apples as opposed to apples with oranges.

Surveying investment analysts and lenders

The company may profit by also talking with investment analysts, institutional investors and investment bankers to obtain their views on appropriate amounts of financial leverage. These analysts examine many companies and are in the business of recommending shares. They therefore have an influence on the financial market. Their judgments with respect to how the market evaluates financial leverage may be very worthwhile. Similarly, a company may wish to interview lenders to see how much debt it can undertake before the cost of borrowing is likely to rise. Finally, the management of a company may develop a 'feel' for what has happened to the market price of their stock when they have issued debt in the past.

Table 14.5: Inter-industry comparison of debt/equity ratios and interest cover

Industry	Debt/equity %			Interest cover (times)		
	1993	1991	1988	1993	1991	1988
Oil and gas	95.99	73.11	111.08	2.39	2.03	2.04
Diversified Resources	88.62	86.26	126.61	3.55	3.20	4.01
Developers and Contractors	66.31	54.97	55.14	2.97	2.42	2.93
Building Materials	60.79	68.35	61.95	3.61	3.10	4.19
Alcohol and Tobacco	117.33	107.91	62.46	2.25	2.13	2.30
Food and Household	99.57	77.94	78.20	3.35	2.18	2.45
Chemicals	30.28	37.33	44.31	5.15	2.70	7.78
Engineering	67.78	63.44	34.91	2.83	1.99	3.48
Paper and Packaging	116.66	129.12	137.39	1.85	1.90	2.59
Retail	178.67	105.00	70.05	1.92	−0.40	3.21
Transport	112.86	138.87	123.68	2.57	1.82	4.22
Media	92.56	154.66	207.96	2.43	0.80	1.86

Source: ASX, *The Stock Exchange Financial and Profitability Study,* various issues.

Security ratings

Whenever a company sells a debt or preferred stock issue to public investors, as opposed to private lenders such as banks, it must have the issue rated by one or more rating services. The principal rating agencies are Moody's Investor Service and S&P Australian Ratings (which is a subsidiary of the US Standard & Poor's group). The issuer of a new corporate security issue contracts with the agency to evaluate the issue as to quality, as well as to update the rating throughout the issue's life. For this service, the issuer pays a fee. In addition, the rating agency charges subscribers to its rating publications. While the assignment of a rating for a new issue is current, changes in ratings of existing securities tend to lag the events that prompt the change.

Both agencies use much the same letter grading. The ratings used by Standard & Poor's, as well as brief descriptions, are shown in Table 14.6. In their ratings, the agencies attempt to rank issues in order of their perceived probability of default. The highest-grade securities, judged to have negligible default risk, are rated triple-A.

Credit ratings in the top four categories (Moody's: Aaa to Baa; Standard & Poor's AAA to BBB) are considered 'investment-grade' quality, while ratings in the other categories signify 'speculative grade'. The ratings by the agencies are widely respected and are recognised by various government regulatory agencies as measures of default risk. In fact, many investors accept them without further investigation of the risk of default.

The rating agencies look at a number of things before assigning a grade. In general terms the rating will reflect a weighting of business risk and financial risk factors. Key business risk factors will include: growth potential, capital requirements, competitive environment, profit potential, position in the industry, diversification, management quality and ownership linkages. On the other hand, financial factors will include: leverage (net debt/equity); debt structure, including an assessment of leases, off-balance sheet obligations, debt of unconsolidated subsidiaries and preference capital; and asset valuation, including intangibles.

Table 14.6: Ratings by S&P Australian ratings

Rating	Selected ratings	Ratings definitions
AAA	Australian Wool Corporation (Guarantor Commonwealth) Telstra (formerly AOTC) Australian Wheat Board	AAA-rated corporations, financial institutions, governments or asset-backed financing structures (entities) have an extremely strong capacity to pay interest and repay principal in a timely manner.
AA +	Federal Airports Corporation	AA-rated entities have a very strong capacity to pay interest and repay principal in a timely manner and differ from the highest rated entities only in small degree.
	Shell Australia	
AA	Gas & Fuel (Guarantor State of Victoria)	
	Lend Lease	
AA –	Coles Myer	
	Arnotts	
A +	BTR Nylex	A-rated entities have a strong capacity to pay interest and principal in a timely manner although they may be somewhat susceptible to the adverse effects of changes in circumstances and economic conditions than those in higher rating categories.
	CIG	
A	BHP	
	Pacific Dunlop	
A –	Australian Gas Light	
	Ford Motor	
BBB +	Qantas Airways	BBB-rated entities have an adequate capacity to repay interest and principal in a timely manner. Protection levels are more likely to be weakened by adverse changes in circumstances and economic conditions than for borrowers in higher categories.
	SA Brewing Holdings	
BBB	Burns Philp	
BBB –	MIM	
BB+	Fosters	Uncertainties or adverse conditions could lead to inadequate capacity to pay. Adverse conditions likely to impair capacity to pay.
B –	Ansett TNT	
CCC	Ariadne	Vulnerable to default
C		High risk of default
D		Default

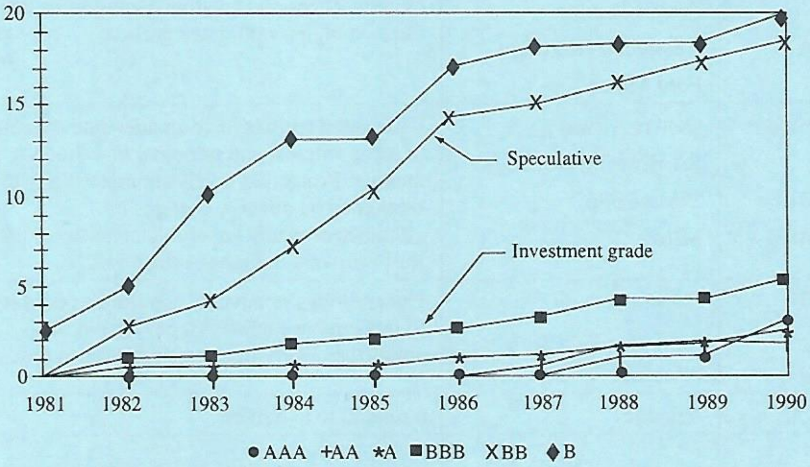
Note: The top four categories indicate investment grade quality securities; the categories below the dashed line are reserved for securities below investment grade.

Source: S & P Australian Ratings, *Monthly Ratings and Bulletin*, August 1993.

Perhaps most important, the cash-flow ability of the company to service interest and principal payments will be examined by these agencies in determining the appropriate rating. If a public security offering is contemplated, the financial manager must be mindful of ratings when determining how much financial leverage is appropriate. If taking on additional debt lowers a company's security rating from an investment to a speculative-grade category—thus making the security ineligible for investment by many institutional investors—the manager will want to factor this into account before making a decision. It may well be that the advantages of debt outweigh the disadvantages of the lower security rating. However, a significant lowering of a security rating is usually a symptom of fundamental debt-servicing problems, which may raise the implicit as well as the explicit cost of financial leverage. Therefore, the financial manager will want to consider the likely effect of a change in financial leverage on the company's security rating.

Academics and financial advisers have used statistical techniques such as discriminant analysis to predict the probability of companies going bankrupt. Similar research has been undertaken to develop models based on ratio analyses of companies in order to predict the rating attached to their debt issues. Variables employed in such analyses commonly include company size, the extent of debt subordination, fixed charges coverage ratio, liquidity, leverage and profitability. In this way finance managers may be able to predict the movement in their company's rating, and its consequent cost of debt, if they decide to change the debt structure. The limitations of the statistical analysis are that it is difficult to introduce many of the qualitative and forward looking factors used by ratings agencies. Nevertheless, such models have often correctly classified 60–80 per cent of ratings in hold-out samples. The fact that ratings agencies themselves are good predictors of the default risk is confirmed by Figure 14.6, which shows default rates on bonds rated by S&P. In general, we find that higher rated corporate bonds had lower default rates.

Figure 14.6: **Cumulated default rates of S&P rated corporate bonds, 1981–1990**



Source: S&P Australian ratings

Dividends and dividend policy

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Readings

Introduction

We all know that 'dividends' are some sort of return from making an investment. When we are looking at public and listed companies as the investment, the term 'dividend' normally refers to the cash paid out to shareholders from the profits (or earnings) that have been generated by the company. This cash payment has two effects. Firstly, it reduces the amount of cash that the company has available and therefore it reduces the size of the assets owned by the company. Secondly, because it reduces the size of the assets, it reduces the size of the shareholder's claim to those assets.

Think of a company that might have $10 million of assets funded by $5 million of debt and $5 million of equity. If $1 million is paid out by way of dividends to the shareholders, the debt providers still clearly have a claim of $5 million on the assets of the company but now the shareholders have a $4 million claim. In accounting terms, the accumulated retained earnings account (which is part of the 'shareholders' funds' section of the balance sheet) has been reduced by the $1 million dividend payment. Hence, the 'shareholders' funds' section of the balance sheet is reduced by that $1 million. The dividends don't have to be paid out of the accumulated retained earnings account. They can be paid from the current years profits (earnings), which would eventually (at the end of the financial year) go into the accumulated retained earnings account.

Imagine that the friends you helped in Topic 9 with their problem of capital structure again approach you for advice. Their questions this time relate to dividends and dividend policy. They begin by telling you that their business did very well last year and it made $1 million in profit. However, how much should they pay out by way of dividends? Should they pay it all out as dividends, or some of it, or should it all be retained in the business? These appear to be simple questions. Regrettably, as in the previous topic, the answers are not quite so simple.

Over the course of this unit we have tried to relate the discussion back to the major goal of financial management—trying to maximise the value (price) of the shares to the shareholders. The discussion in this topic will also be related to that goal. Let's make your friends' questions a little more specific. We should ask 'whether the payment of a large dividend or a small dividend in any way impacts on the value of the company shares'. By paying a large dividend it looks like we are giving as much as possible back to the shareholders. By paying a small dividend, the cash that would have otherwise been used for the dividend is being retained by the company to invest on behalf of the shareholders. Which is preferable? If we can discover the answer to this question, we can then head towards our major goal.

In this topic, we will also spend some time discussing share repurchases as an alternative to cash dividends. Share 'buy backs' as they are known in Australia are relatively new but they have been used for many years overseas.

We will also discuss bonus issues, share splits and reverse splits as means of 'rewarding' shareholders with new shares rather than with cash.

Employees are also sometimes rewarded for their labour by companies using employee share ownership plans. Such plans are also discussed briefly in this topic.

Dividend policy and business confidence

Some investment managers believe a company's dividend policy is of great importance because of the information it conveys to investors. They see dividend policy as a good indicator of a company's profit expectations and furthermore if companies are able to increase their dividend payout they are expressing confidence about the company's future earnings.

Some regard dividends as the most important forecast after profit. Higher profits for the current year do not automatically translate into higher dividends for shareholders, as some companies will use profits to invest in new equipment or to rebuild cash reserves after maintaining dividends in recent lean years. Many companies will make an effort to maintain dividends to keep investors, many of whom need dividends to replace income from fixed-interest investments.

The determination of dividends will also be affected by management policy in that:

- organisations often have target payout ratios for both the short term and the long term;
- management often attempts to maintain a consistent and even flow of dividends in dollar terms; and
- management is sometimes reluctant to make changes to dividends that may have to be changed dramatically at a later date.

While the general perception is that dividends are an allocation of company profits to the shareholders, the dividend policy will determine the proportion of profits payable to the shareholders and the amount retained for internal financing of new long-term projects.

The return on a shareholder's investment comprises the dividends received and the capital gain or loss during the period that the shares are held.

In this chapter you will learn about the effects of dividend policy on the ability of shareholders to maximise wealth.

Source: Gitman et al. 1998, p. 559.

Objectives

At the completion of this topic you should be able to:

- outline what dividends are and what types of dividends can be paid;
- explain the chronology of dividend payments;
- explain dividend imputation;
- understand that not all shareholders will prefer dividends to increases in the share price of the company;
- describe the residual dividend approach;

- explain the compromise dividend policy;
- define how a dividend reinvestment plan works;
- define the nature of share buy backs and the financial and accounting consequences of share buy backs;
- explain bonus issues, share splits and reverse splits; and
- describe the basics of employee share ownership plans.

Learning resources

Textbook

Ross, S.A., Westerfield, R.W. & Jordan, B.D. 2000
Fundamentals of Corporate Finance
5th edn, Irwin McGraw-Hill, Boston, chapter 17.

Readings

Dunn, J. 1999
'Buyback bounty'
Age, Money and Investment Supplement,
1 Mar., p. 4.

Ross, S. et al. 2001
'A resolution of real-world factors?'
Fundamentals of Corporate Finance
2nd Australian edn, Irwin, Sydney, pp. 620–3.

Ross, S. et al. 2001
'Real-world factors favouring a high payout'
Fundamentals of Corporate Finance
2nd Australian edn, Irwin, Sydney, pp. 618–20.

Ross, S. et al. 2001
'Real-world factors favouring a low payout'
Fundamentals of Corporate Finance
2nd Australian edn, Irwin, Sydney, pp. 613–8.

Schmidt, L. 1994
'Dividend reinvestment plans: The good news keeps coming'
Business Review Weekly
19 Sept., pp. 120–1.

Thomson, J. 2001
'Buybacks boom'
Business Review Weekly
2 March, p. 40.

Key concepts

The following key concepts are introduced and developed in this topic:

- bonus issue;
- reverse split;
- share split;
- dividend reinvestment plan;
- dividend imputation;
- ex dividend date;
- residual dividend approach;
- target dividend payout ratio;
- share repurchases or buy backs; and
- employee share ownership plans.

Cash dividends and dividend payment

The most common dividends from publicly listed companies are the regular cash payments made every six months or every year, but these are not the only sort of dividends that companies may provide. In this section we will discuss the various kinds of dividends and how they are paid. You will note that not all payments from the company to the shareholders are dividends. Sometimes companies return equity capital. These sorts of payments should technically be called 'distributions'.

Reading

Please read the introduction to Chapter 17 and 'Cash dividends and dividend payment' (Section 17.1) in Ross et al. 2000, pp. 520–4.

You should note the following points:

- **a huge amount of cash dividends is paid out by NYSE, listed companies—$130 billion. Note also that there is a fair proportion of companies that pay no dividend at all (p. 520);**
- **the regular cash dividend might be four times a year in the USA (p.521). Note it is normally twice a year in Australia (an interim dividend and a final dividend);**
- **sometimes companies may pay an 'extra' dividend (p. 521);**
- **a 'special dividend' is like an extra dividend but the special dividend may be really unusual and will not be repeated (p. 521);**
- **a 'liquidating dividend' means that the business is liquidated and that it will be the final payment to the owners (p. 522). This expression of 'liquidating dividend' is not strictly correct because**

the final payment is likely to include a return of previous years' profits and also a return of capital;

- **the board of directors of a company has the right to declare dividends and once declared they become a liability (pp. 522–3);**
- **the dividend is normally initially expressed in dollars (or cents) per share and then may be expressed as a 'dividend yield' or a 'dividend payout' (p. 522);**
- **note the chronology of the dividend payment (pp. 522–3). Note that in Australia the 'ex-dividend' (or without dividend) date is five business days (making the ex-dividend date Monday 26th January in the textbook example) before the date of record date (also known in Australia as the 'books closing date' or the 'shareholder's register closing date'). Australian companies clearly state the ex-dividend date so if you are already an investor, or want to become an investor in an Australian publicly listed company, you should make sure you know this date; and**
- **we would expect the price of the shares to fall on the ex-dividend date by 'about' the dividend payment. The expression 'about' is used because the fall is likely to be the after-tax value of the dividend, because dividends are taxable (pp. 523–4).**

Exercise 10.1

Attempt 'Concepts review and critical thinking question' 4 in Ross et al. 2000, p. 547. Use the US ex-dividend date as being two business days prior to the date of record.

Does dividend policy matter?

Before we discuss whether dividend policy matters, we need to define what the expression 'dividend policy' actually means. Then, we need to discuss to what the expression 'matters' should be linked, i.e. matters to what? Dividend policy basically refers to the timing of the dividend payments. To what then, does this timing of the dividend payments matter? Since the major goal of financial management is to maximise the share price, we want the timing of the dividend payments to matter to the share price.

Reading

Please read 'Does dividend policy matter?' (Section 17.2) in Ross et al. 2000, pp. 524–7. You should note the following points:

- **the example shows the pricing of a share where the entire cash flow of a firm is paid out by way of dividends (using the dividend valuation model which you encountered in Topic 3) (pp. 524–6);**
- **note the pricing of the share where there is an increased dividend in the first year by raising new equity capital to pay for this dividend (p. 526). Note that this is not possible in Australia because it will contravene the Corporations Law. Companies in Australia cannot pay dividends from capital—they can only pay dividends from profits;**
- **the share price will not be moved by changing the amount and the timing of the dividend payments (p. 526);**

- **a homemade dividend policy allows investors to either sell shares (to create a so-called dividend) or reinvest unneeded dividends into new shares to counteract (or undo) the company's dividend policy (pp. 526–7);**
- **a dividend reinvestment plan (referred to as DRPs in Australia) is offered to existing shareholders to allow them to create 'homemade dividend policies' (p. 527); and**
- **note the ideas that the payment of dividends is relevant (important), while the dividend policy may be irrelevant (p. 527).**

Please note that the examples so far have been in a world of no company taxes, no personal taxes and no flotation costs. We will relax these assumptions in the next section.

Exercise 10.2

Attempt 'Concepts review and critical thinking questions' 1, 6 and 7 in Ross et al. 2000, pp. 547–8.

Real-world factors favouring a low payout

In this section we look at what might cause companies to favour a low dividend payout. The term 'payout' refers to the amount of dividends paid from profits (or earnings). A low dividend payout means a low percentage of profits is paid out by way of dividends, while a high payout reflects a high percentage of profits being used to pay dividends.

We will be studying the Australian tax and dividend environment here rather than the US tax and dividend environment. Figures in Table 19.2 in Reading 10.1 have been adjusted to reflect the Australian tax situation in 1998–1999. We have not included a very small Medicare levy which is payable by individual taxpayers so as to keep the example simple. Note also that you encountered capital gains tax in Topic 4 and you were introduced to franked dividends in Topic 7.

You should also be aware at this stage that sometimes there may be restrictions on the amount of dividends able to be paid out. Debenture trust deeds, for example, may prohibit dividend payments over a certain level. Such a restriction is used by the trustee for the debenture holders to protect the interests of the debenture holders.

Reading

Please read Ross et al. 2001, 'Real-world factors favouring a low payout'. You should note the following points:

- **note how dividend imputation allows resident Australian shareholders to receive a tax credit on dividend income received for company tax paid. You might even think that under the dividend imputation system the payment of taxes on earnings by a company is effectively a 'pre-payment' of personal taxes;**
- **the example in Table 19.3 shows the different 'additional cash flow from the dividend';**

- the different marginal tax rates of each of the investors and their capital gains tax liabilities have a great deal to do with whether investors prefer to receive dividends;
- two major issues need to be clarified by a company in determining an appropriate dividend policy:
  1. Knowing that it has profitable investment opportunities that will increase the value of the firm and by paying out the dividends, it will need to raise additional capital which has associated flotation costs.
  2. The company must know that the company's shareholders want in terms of dividends so as to maximise their after-tax returns either from dividends or from increases in the share price resulting from the profitable investments.

Real-world factors favouring a high payout

Over the years finance writers have offered various reasons for advocating high payouts. In this section you will see that the circumstances of the shareholders are critical in determining appropriate dividends.

Reading

Please read Ross et al. 2001, 'Real-world factors favouring a high payout'. You should note the following points:

- the desire for current income and the resolution of uncertainty are popular arguments for paying high dividends. The idea that these reasons can be countered by using 'homemade dividends' (by selling shares) is not an appropriate rebuttal if the company doesn't pay dividends because of the brokerage and other transaction costs;
- the fact that franked dividends are taxed favourably for many individual investors is a strong argument for a high payout;
- corporate investors who receive fully franked dividends will not have to pay tax on that dividend income. On the other hand they will have to pay capital gains tax on the profits of the sale of shares;
- superannuation funds (also called super funds) are significant investors in Australian equities. Super funds are presently taxed at 15% on the income they receive. Super funds are also entitled to claim the 36% tax credit if this was the rate of tax paid by the company on the company's earnings. It is not hard to see that super funds get a very significant additional cash flow from the dividends they receive if they also earn income other than dividend income on which tax must be paid. This other income might be rental income or interest income. Super funds that do not have this other income do not benefit as much;
- institutions that manage money for the benefit of others have a fiduciary duty to invest money prudently—this includes investing in companies that pay dividends; and
- those institutions that are prohibited from spending their principal (capital) are likely to prefer high dividend payouts.

Exercise 10.3

Attempt the following questions.

1. **The Mimutt Company Ltd has earnings of $2500 for the year, after paying company tax at 30%, which it intends to pay out as a dividend. Mr Yap owns 20% of the share capital. His other taxable income is $100 000, so that his marginal tax rate is 47%. Mrs Growl also owns 20% of the company; however, her other taxable income is only $15 000. Her marginal tax rate is 17% because of the dividend imputation scheme. Is the dividend income more valuable in the hands of Mr Yap or Mrs Growl?**

2. **The University of Norway pays no taxes on its capital gains nor on its dividend income and interest payments. Would it be irrational to find low-dividend, high-growth shares in its portfolio? Would it be irrational to find government (tax-free) bonds which carry tax concessions? Explain.**

Source: Ross et al. 2001, pp. 636–9.

A resolution of real-world factors?

In this section we discuss two other issues related to dividends and dividend policy: the information content of dividends and the clientele effect. The information content of dividends relates to the market's reaction to a change in dividend payout. The clientele effect suggests that companies attract particular groups of shareholders because of their dividend policies.

Reading

Please read Ross et al. 2001, 'A resolution of real-world factors?'. You should note the following points:

- **in the real world, share prices have tended to rise when dividend increases are unexpectedly announced;**
- **in the real world, share prices have tended to fall when dividend decreases are unexpectedly announced;**
- **stability of dividends is important and companies are reluctant to cut dividends;**
- **the amount of dividends and the stability of those dividends are major determinants of share price, not the payout ratio (which, remember, reflects the percentage of dividends paid out of earnings); and**
- **the clientele effect suggests that different groups of investors desire different levels of dividends.**

Establishing a dividend policy

At this time it is worth reviewing each of the italicised points under the last three headings: 'Real-world factors favouring a low payout', 'Real-world factors favouring a high payout' and a 'A resolution of real-world factors?'. Even though it's not easy, the best managers are those that understand these issues. How then do companies presently establish appropriate dividend policies?

Reading

Please read 'Establishing a dividend policy' (Section 17.6) in Ross et al. 2000, pp. 535–9. You should note the following points:

- **a company that wishes to avoid selling new equity (because of its cost), and wants to maintain its present capital structure, will need to rely on internally generated equity to fund new positive NPV projects and will rely on a residual dividend approach (p. 535);**
- **the steps in implementing a residual dividend approach include:**
  1. **determining the amount of after-tax cash flows generated internally that can be used to fund new positive NPV projects;**
  2. **determining the amount required for these new positive NPV projects;**
  3. **determining how much extra debt and equity is required for the new projects without going over the target debt-to-equity ratio;**
  4. **determining the amount of dividends that can be paid after funding the new projects (pp. 535–7);**
- **dividend stability must be remembered when contemplating the residual dividend approach (pp. 537–8);**
- **the compromise dividend policy commonly used in the real world suggests that companies:**
  1. **avoid cutting back on positive NPV project;**
  2. **avoid dividend cut;**
  3. **avoid the need to sell equity;**
  4. **maintain a target debt-to-equity ratio; and**
  5. **maintain a target dividend payout ratio (pp. 538–9).**
- **a target dividend payout ratio refers to a company's desired long term dividend-to-earnings (profits) ratio (p. 539); and**
- **special or extra dividends can be used in addition to regular dividends to minimise the problem of dividend instability (p. 539).**

Exercise 10.4

Attempt 'Chapter review and self-test problem' 17.1 (p. 546), 'Concepts review and critical thinking questions' 3 and 9 (pp. 547–8) and 'Questions and problems' 10, 11 and 12 (p. 551) in Ross et al. 2000.

Dividend reinvestment plans

Around 15–20% of Australian publicly listed companies offer shareholders the opportunity of reinvesting their dividends into more shares. These dividend reinvestment plans (DRPs) help address the conflict between the company's need for capital to fund new positive NPV projects and the desire of shareholders to receive franked dividends.

Investors must elect to participate in DRPs and cannot be forced to do so by the company. Once the election is made, the company will automatically reinvest all, or part, of the dividend entitlement into new fully paid ordinary shares. The shareholder must still continue to lodge their tax returns showing that a dividend has been received and include the level of the franking credit that was associated with the dividend.

There are no brokerage costs or stamp duty associated with DRPs and shareholders are able to acquire the new shares generally at a slight discount to the existing market price. The discount on the market price ranges from 2% to 10%, but there are some that that offer no discount at all, like National Australia Bank, Commonwealth Bank and David Jones. Some very noteable companies that offer slight discounts include The News Corporation, Qantas, Coles Myer and BHP. From the company's viewpoint there is also no need to issue a prospectus with this type of capital raising.

Exercise 10.5

Find out if your company, or a company in which you might be interested in buying shares, has a DRP. Would you take advantage of the opportunity to reinvest your dividends in additional shares?

Exercise 10.6

Attempt 'Concepts review and critical thinking question' 8 (p. 548) in Ross et al. 2000.

Stock repurchase: An alternative to cash dividends

Share repurchases (or share buy backs, as they are commonly known) are when companies actually buy back their own shares and reduce the number of shares issued in the market. In Australia, Australian Stock Exchange listing requirements limit companies to buying back no more than 10% of their issued capital in a 12-month period. By issued capital we mean 10% of the number of shares, so if a company has issued 10 million shares, then 1 million shares may be repurchased in any 12-month period. Even though stock repurchases have been used for over 25 years in the USA, they have only been allowed to be used in Australia for less than 10 years.

Please read 'Stock repurchase: An alternative to cash dividends' (Section 17.7) in Ross et al. 2000, pp. 542–5. You should note the following points:

Reading

- **by paying a cash dividend, the wealth of the shareholders doesn't change, the EPS doesn't change (because the number of shares remains the same), but the price–earnings ratio changes (pp. 539–40);**
- **by using a share repurchase scheme, the wealth of the shareholders doesn't change, the EPS goes up (because there are fewer shareholders), and the price–earnings ratio changes to the same amount as if a cash dividend was paid (pp. 539–40); and**
- **the 'Real-world considerations in a repurchase' section relates to the US situation. In Australia, the tax consequences for a shareholder (who is not in the business of continually dealing in or trading in shares) who sells their shares depends on when the shares were first acquired. If the shares were first acquired before 20 September 1985, then there is no tax payable on any profit because the shares are exempt from capital gains tax. For a shareholder who acquired the shares after 20 September 1985, capital gains tax would apply to any profit from the sale. On the other hand, the cash dividend might carry with it franking credits which would be able to be used by the shareholder. There is no easy answer as to which would be preferable to the shareholder—it depends on the tax circumstances of the investor.**

The buyback boom

In February 1994, Philip Morris announced a 3-year plan to repurchase $7.3 billion of its stock. Through June 1995, when 35% of the program was complete, the stock price rose from $58.75 to $74.88, or 27%. Just 6 months after IBM began its $2.5 billion program in early 1995, the stock rose 53%; the company announced a second $2.5 billion buyback in July 1995.

In a study of 1239 open-market repurchases from 1980 to 1990, the average stock rose 3.5% on the announcement day. Four years after the buybacks, these companies generally outperformed the market. But the extent of the price increase depends on the percentage of total equity the repurchase represents, the speed of the transaction, and if the company retires the repurchased shares. And investors who rush to buy on news of a buyback may be disappointed; only about 20% of announced repurchase programs become reality. The purpose of the buyback is another factor. Repurchasing shares for employee stock plans, as Microsoft did in July 1995, doesn't affect share value.

Source: Gitman 1997, pp. 587–8.

Please read Dunn 1999, 'Buyback bounty' for a description of how two of Australia's largest banks are buying back some of their shares. Note-taking is not required.

Reading

Please also read Thomson 2001, 'Buybacks boom'.

Reading

Exercise 10.7

Attempt 'Chapter review and self-test problem' 17.2 (pp. 546–7), 'Concepts review and critical thinking question' 2 (p. 547) and 'Questions and problems' 16 (a) and (b) (p. 552) in Ross et al. 2000.

Stock dividends and stock splits

Two other alternatives to cash dividends are frequently used. They are stock dividends and stock splits. Stock or share dividends are known in Australia as bonus issues. They are a free-of-charge issue of new shares to existing shareholders in the proportion of shares already held. The US situation refers to the stock dividend on a percentage basis, for example a 20% stock dividend. We in Australia refer to the bonus issue as a ratio, by suggesting the number of new shares offered (e.g. one for five, meaning one new share for every five already held). Stock or share splits are referred to in both countries as a ratio.

Reading

Please read 'Stock dividends and stock splits' (Section 17.8) in Ross et al. 2000, pp. 542–5. You should note the following points:

- **bonus issues and share splits basically have the same impact—they increase the number of shares and reduce the value per share (pp. 542–3);**
- **the accounting treatment for bonus shares and share splits is the treatment used in the USA (pp. 543–4).**

The treatment of bonus issues is different in Australia. If we begin with Peterson's equity section of the balance sheet shown on p. 543, in Australia it might be:

Ordinary shares ($1 par, 10 000 issued shares)	$10 000
Share premium reserve	$200 000
Retained earnings	$290 000
Total shareholders' funds	$500 000

After a 1-for-10 bonus issue the equity section of the balance sheet would be:

Ordinary shares ($1 par, 11 000 issued shares)	$11 000
Share premium reserve	$199 000
Retained earnings	$290 000
Total shareholders' funds	$500 000

Note that in this instance the bonus issue is taken from the share premium reserve account. This account is reduced by $1000 and the ordinary shares capital account is increased by $1000.

If the company decided to offer a 1-for-1 bonus issue, the equity section of the balance sheet would be:

Ordinary shares ($1 par, 20 000 issued shares)	$20 000
Share premium reserve	$190 000
Retained earnings	$290 000
Total shareholders' funds	$500 000

In Australia, companies are restricted presently to issuing bonus shares only from 'capital accounts'. The most common of these capital accounts are share premium reserve accounts or asset revaluation reserves. The share premium reserve account reflects the cash received from the sale of the companies shares over and above the par value of the shares. The asset revaluation reserve reflects any revaluations of fixed assets (like land and buildings) that might be more correctly valued in the balance sheet at their current (increased) value.

If a bonus issue is made from an asset revaluation reserve account then such an issue is regarded as taxable in the hands of the shareholder. The Taxation Office regards this bonus issue as a passing on of the wealth from the company to the shareholder. If, on the other hand, a bonus issue is made from the share premium reserve account, no tax is payable by the shareholder. Here, the Taxation Office simply regards this as a reorganisation of the capital accounts. You should keep this issue in mind if you are ever involved with bonus shares.

Let's turn our attention to the share split using Australian accounting conventions. Refer back to the equity section of the initial balance sheet for Peterson's to review the present position (Ross et al. 2000, p. 543). Now, if the company decided to offer a 2-for-1 share split, the equity section would be:

Ordinary shares ($0.50 par, 20,000 issued shares)	$10,000
Share premium reserve	$200,000
Retained earnings	$290,000
Total shareholders funds	$500,000

- *note how the theoretical market value of the shares should have been reduced to reflect the increased number of shares (p. 543). You should be able to see that if the number of shares doubles (as a result of either the share split or the bonus issue) that the share price theoretically should halve. Logic suggests that there are no more assets available, no extra earning power, the risk of the company is unlikely to have changed overnight and therefore there should be no effect on shareholder wealth;*
- *note the argument of using bonus issues and share splits to reduce the market price back to a more popular trading range (p. 544); and*
- *note the use of reverse splits (p. 545). Note the two reasons for reverse splits suggested on p. 545 are not applicable in Australia.*

Exercise 10.8

Attempt 'Questions and problems' 3 and 4 (a), (d) and (e) in Ross et al. 2000, p. 550.

Employee share ownership plans

While dividends are a return on capital employed, many companies offer employee share ownership plans (referred to as ESOPs or ESPs) as a reward or 'return' to employees for their labour. ESOPs are very much encouraged by the Australian Government.

In the simplest form, employees are able to buy shares in the employer company at a slight discount to the market price. Employees are able to obtain a discount of up to $200 per year provided the discount on the shares is no greater than 10% of the market price and the scheme is available to all permanent employees on an equal basis. Sometimes these shares are even funded by a loan from the company, with the shares used as security for the loan. The shares may be a special class of share (perhaps non-voting) and they may be fully paid or partly paid. Partly paid shares are attractive in that the cost base of the asset is determined as soon as the shares are issued, regardless of the fact that they have not yet been fully paid. This cost base is then used for the calculation of any possible capital gains tax liability.

Employee share options are also often used. The options normally have a fixed exercise date at some point in the future and they are not transferable. For capital gains tax purposes the shares are deemed to have been acquired when the option was exercised.

Summary

We began this topic by defining dividends as a return to the company's shareholders and then discussed the types of dividends and how they can be paid. (We know that the Corporations Law of Australia insists that dividends be paid out of profits and not capital.) We then discussed dividend policy as referring to the timing of the dividends and whether the timing of dividend payments mattered to our objective of trying to maximise the wealth of the owners.

In this topic we also discovered that some shareholders favour a high dividend payout since the dividends may carry a franking credit. Many companies have developed dividend reinvestment plan to allow shareholders who prefer a low payout to reinvest their dividends into the shares of the company.

We decided that dividend stability is usually viewed favourably and that a strict residual dividend payout policy may not be in the interests of the shareholders. This led us to conclude that most companies follow a compromise dividend policy which provides for a stable dividend but also avoids cutting back on positive NPV projects, while trying to maintain a target debt-to-equity ratio.

Share buy backs and extra dividend can be used from time to time, while bonus issues and share splits may be used to provide more shares to the existing shareholders without the need for cash to be paid to them.

In the last section of this topic we suggested that in addition to the rewards to shareholders, employee share ownership plans are being used to reward labour.

It is worth finishing this topic with a quote from Ross et al. (2000, p. 546):

> To close out our discussion of dividends, we emphasise one last time the difference between dividends and dividend policy. Dividends are important, because the value of a share of stock is ultimately determined by the dividends that will be paid. What is less clear is whether or not the time pattern of dividends (more now versus more later) matters. But this is the dividend policy question, and it is not easy to give a definitive answer to it.

Reading

Please read 'Summary and conclusions' (Section 17.9) in Ross et al. 2000, pp. 545–6.

Review question

Review question 10.1

Attempt 'Concepts review and critical thinking question' 10 in Ross et al. 2000, pp. 548–9.

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Further resources

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Van Horne, J., Wachowicz, J., Davis, K. & Lawriwsky, M. 1995, *Financial Management and Policy in Australia,* 4th edn, Prentice Hall, Sydney.

Suggested answers

Topic 10

Exercises

Exercise 10.1

4. Friday, 29 December is the ex-dividend day. Remember not to count 1 January because it is a holiday, and the exchanges are closed. Anyone who buys the stock before 29 December is entitled to the dividend, assuming they do not sell it again before 29 December.

Exercise 10.2

1. Dividend policy deals with the timing of dividend payments, not the amounts ultimately paid. Dividend policy is irrelevant when the timing of dividend payments doesn't affect the present value of all future dividends.

6. The change in price is due to the change in dividends, not to the change in dividend *policy*. Dividend policy can still be irrelevant without a contradiction. The increased dividend is viewed by the market as increased future earnings potential.

7. The stock price dropped because of an expected drop in future dividends. Since the stock price is the present value of all future dividend payments, if the expected future dividend payments decrease, then the stock price will decline.

Exercise 10.3

1. The dividend and the imputations credits that will accrue to Mr Yap and Mrs Growl because of their 20% holdings in Mimutt Company Ltd is:

Dividend: 20% of $2500	$500
Imputation credit: 20% of 30% of $2500/.70	214
Grossed up income $500/.61	$714

The tax situations are as follows:

	Mr Yap	Mrs Growl
Grossed up dividend income	$714	$714
Tax at shareholders' marginal rate	336	121
Imputation credit	(214)	(214)
Tax payable on the dividend	122	(93)
Dividend received	$500	$500
Tax (payable) credit	(122)	93
Net gain from the dividend	$378	$593

The dividend is more valuable to Mrs Growl.

2. It would not be irrational to find low-dividend, high-growth shares. The university should be indifferent between receiving dividends or capital gains since it does not pay taxes on either (ignoring possible restrictions on invasion of principal, etc.) It would be irrational, however, to hold government bonds. Since it does not pay taxes on interest received, it does not need the tax break with the bonds. Note that the tax concessions provided with government bonds were linked to lower interest rates. Therefore, it should prefer to hold the higher yielding, taxable bonds.

Exercise 10.4

3. The chief drawback of a strict dividend policy is the variability in dividend payments. This is a problem because investors tend to want a somewhat predictable cash flow. Also, if there is information content to dividend announcements, then the firm may be inadvertently telling the market that it is expecting a downturn in earnings prospects when it cuts a dividend, when in reality its prospects are very good. In a compromise policy, the firm maintains a relatively constant dividend. It increases dividends only when it expects earnings to remain at a sufficiently high level to pay the larger dividends, and it lowers the dividend only if it absolutely has to.

9. If these firms just went public, they probably did so because they were growing and needed the additional capital. Growth firms typically pay very small cash dividends, if they pay a dividend at all. This is because they have numerous projects, and they therefore reinvest the earnings in the firm instead of paying cash dividends.

10. Equity portion of capital outlays = $600 – $350 = $250; D/E = .80 implies capital structure is .8/1.8 debt and 1/1.8 equity. Therefore, new borrowings = $200; total capital outlays = $450.

11. (a) payout ratio = DPS/EPS = $1.00/$5 = .20

    (b) equity portion of capital outlays = 7M shares ($5 – $1.00) = $28M

    D/E ratio = $13M/$28M = 0.4643

12. (a) maximum capital outlays with no equity financing
    = $100 000 + 3($100 000) = $400 000.

    (b) If planned capital spending is $550 000, then no dividend will be paid and new equity will be issued since this exceeds the amount calculated in Part A.

(c) No, they do not maintain a constant dividend payout because, with the strict residual policy, the dividend will depend on the investment opportunities and earnings. As these two things vary, the dividend payout will also vary.

Exercise 10.6

8. The plan will probably have little effect on shareholder wealth. The shareholders can reinvest on their own, and the shareholders must pay the taxes on the dividends either way. However, the shareholders who take the option may benefit at the expense of the ones who don't (because of the discount). Also as a result of the plan, the firm will be able to raise equity by paying a 10% flotation cost (the discount), which may be a smaller discount than the market flotation costs of a new issue for some companies.

Exercise 10.7

2. A stock repurchase reduces equity while leaving debt unchanged. The debt ratio rises. A firm could, if desired, use excess cash to reduce debt instead. This is a capital structure decision.

16. (a) cash dividend: DPS = \$2800/150 shares = \$18.67;
P_X = \$30 – \$18.67 = \$11.33 per share
wealth of a shareholder = a share worth \$11.33
plus \$18.67 cash = \$30
repurchase: \$2800/\$30 = 93.33 shares will be repurchased.
If you choose to let your shares be repurchased,
you have \$30 in cash; if you keep your shares,
they're still worth \$30.
(b) dividends: EPS = \$0.80; P/E = \$11.33/\$0.80 = 14.16
repurchase: EPS = \$.80(150)/(150 – 93.33) = \$2.12;
P/E = \$30/\$2.12 = 14.16

Exercise 10.8

3. (a) New shares outstanding = 4000(4) = 16 000. The equity accounts are unchanged except the par value of the stock is now \$0.25 per share.

(b) New shares outstanding = 4000(1/5) = 800. The equity accounts are unchanged except the par value of the stock is now \$5.00 per share.

4. (a) \$50(3/5) = \$30.00

(d) \$50(7/4) = \$87.50

(e) *a:* 200 000(5/3) = 333 333; *b:* 200 000(1.15) = 230 000;

c: 200 000(1.425) = 285 000; *d:* 200 000(4/7) = 114 286.

Review question

Review question 10.1

10. (a) First, it probably is not a good time to raise dividends if earnings are not good, and it is not certain that the higher dividend can be maintained. It would be worse to raise the dividend and then to later cut it back again. Second, if the firm can invest the money profitably, then it should do so. That is the basis for positive net present value projects.

(b) On theoretical grounds, there is nothing inherently wrong with 'borrowing to pay dividends', but most practitioners would probably feel that this is not the soundest financial policy. For example, it may have adverse structure consequences, or may limit the firm's accessibility to the capital markets if it has to borrow again in the near future for real investment needs. In any case, if the firm needs the money to fund profitable investments, it should probably not raise the dividend.

(c) Neither one, really. Its dividend policy should probably be based on its long-range capital needs.

(d) The company should not be too worried about the little old lady in Iowa. If she wants higher dividends, she can sell her stock in Clark and buy stock in a company that pays a higher dividend, or she can sell off portions of Clark stock as needed to achieve the cash flow she desires.

Buyback bounty

James Dunn

Source: Dunn, J. 1999, 'Buyback bounty', *Age,* Money and Investment Supplement, 1 Mar., p. 4.

As two big banks launch yet another round of share buybacks, stockholders will find the benefits of accepting either offer are huge for some and paltry for others.

Two of Australia's largest banks are again indulging in what has become a recent fad among their peers, of showering largesse on their shareholders in the form of share buybacks.

In February, Commonwealth Bank announced a $650 million off-market buyback of shares and Westpac announced an on-market buyback of up to 2.5 per cent of its capital (up to 50 million shares).

For CBA, it is the third time it has offered its shareholders cash for their shares. On the first occasion, in August 1996, the buyback was mounted by the bank's then majority shareholder, the Federal Government.
For Westpac, it is buyback number six.

By the end of the latest offer, CBA will have spent $2.3 billion buying back 17 per cent of its shares; Westpac will have directed the same amount into the pockets of its shareholders in return for about the same proportion of shares.

The rationale for the banks—and other companies buying back their shares—is 'active capital management to improve shareholder value' as Westpac's chief financial officer, Pat Handley, describes it.

In times of low inflation and low interest rates, the banks are awash with excess capital that cannot be invested at a worthwhile return. If they cannot find a suitable acquisition on which to spend the cash, the acceptable alternative is to put some of the cash in the pockets of shareholders through a share buyback.

CBA has gone further than merely paying its shareholders for some of their shares: it is offering them a substantial fully franked dividend, plus the opportunity to incur a capital loss. This capital loss may be offset against capital gains, and may be carried forward indefinitely.

The potential capital loss arises from the fact that for capital gains tax (CGT) purposes, resident CBA shareholders who accept the offer will be deemed to have sold their shares at $9 a share. If the cost base of their shares exceeds $9 a share, resident shareholders will be eligible to claim a capital loss for the difference. In effect, this means that the relative benefits of accepting the buyback will differ for each shareholder.

Because the buyback is to be funded from both retained earnings and the share premium reserve, for most shareholders the portion of the buyback price above $9—that is, $14.08 at the indicated base price—will be deemed a fully franked dividend.

David Arter, a banking analyst at broking firm D&D-Tolhurst, says the structure gives CBA shareholders the opportunity to obtain significant franking credits while also having the potential to realise a substantial capital loss.

Although the relative benefits of accepting the buyback will differ for each shareholder, says Mr Arter, acceptance will be relatively more valuable to resident individual shareholders able to utilise franking credits and capital losses for taxation purposes.

CBA is offering to buy back up to 15 per cent of individual shareholdings at a base price of $23.08, adjusted for fluctuations in the All Industrials Index between 10 February and 19 March.

CBA shareholders have the choice to sell up to 15 per cent of their shares back to the company, or decline the offer. If the overall level of acceptances exceeds $650 million worth of shares, the number of shares bought back from each holder will be scaled back on a pro-rata basis.

The CBA offer opens on 1 March and closes on 19 March. The buyback price will be announced on 22 March. The bank says the buyback should be completed by 24 March, with cheques on their way to participating shareholders by the following day.

The Westpac buyback, also announced in February, will be effective from 3 March and be conducted over a period of six months, or until the 50 million shares have been bought back. If the Westpac share price stays where it is, at $10.89, the buyback will cost the bank $545 million.

Being an on-market buyback, Westpac shareholders are not faced with the same set of considerations that await CBA shareholders. Their decision whether to sell is the same as it is at any time: Westpac is acting as a buyer in the market for its own shares, and its shareholders will face the same investment and tax considerations they would have in selling at any time to any buyer.

A resolution of real-world factors?

S. Ross et al.

Source: Ross, S., Thompson, S., Christensen, M., Westerfield, R. & Jordan, B. 2001, *Fundamentals of Corporate Finance,* 2nd Austn edn, Irwin, Sydney, pp. 620–3.

In the previous sections, we presented some factors that favour a low-dividend policy and others that favour high dividends. In this section, we discuss two important concepts related to dividends and dividend policy: the information content of dividends and the clientele effect. The first topic illustrates both the importance of dividends in general and the importance of distinguishing between dividends and dividend policy. The second topic suggests that, despite the many real-world considerations we have discussed, the dividend payout ratio may not be as important as we originally imagined.

Information content of dividends

To begin, we quickly review some of our earlier discussion. Our previous discussion has established three different positions on dividends:

1. Based on the homemade dividend argument, dividend policy is irrelevant.
2. Because of high taxation of some individual investors, a high-dividend policy may be best.
3. Because of new issue costs, a low-dividend policy is best.

If you wanted to decide which of these positions is the right one, an obvious way to get started would be to look at what happens to share prices when companies announce dividend changes. You would find with some consistency that share prices rise when the current dividend is unexpectedly increased, and they generally fall when the dividend is unexpectedly decreased. What does this imply about any of the three positions just stated?

At first glance, the behaviour we describe seems consistent with the second position and inconsistent with the other two. In fact, many writers have argued this. If share prices rise on dividend increases and fall on dividend decreases, then isn't the market saying it approves of higher dividends?

Other authors have pointed out that this observation doesn't really tell us much about dividend policy. Everyone agrees that dividends are important, all other things being equal. Companies only cut dividends with great reluctance. Thus, a dividend cut is often a signal that the firm is in trouble.

More to the point, a dividend cut is usually not a voluntary, planned change in dividend policy. Instead, it usually signals that management does not think that the current dividend policy can be maintained. As a result, expectations of future dividends should generally be revised downward. The present value of expected future dividends falls and so does the share price.

In this case, the share price declines following a dividend cut because future dividends are generally lower, not because the firm changes the percentage of its earnings it will pay out in the form of dividends.

To give a particularly dramatic example, consider what happened to Consolidated Edison, a large United States public utility, in 1974. Faced with poor operating results and problems associated with the OPEC oil embargo, Con Ed announced after the market closed that it was omitting its regular quarterly dividend of 45 cents per share. This was somewhat surprising given Con Ed's size, prominence in the industry, and long dividend history. Also, Con Ed's earnings at that time were sufficient to pay the dividend, at least by some analysts' estimates.

The next morning was not pleasant. Sell orders were so heavy that a market could not be established for several hours. When trading finally got started, the shares opened at about $12 per share, down from $18 the day before. In other words, Con Ed, a very large company, lost about one-third of its market value overnight. As this case illustrates, shareholders can react very negatively to unanticipated cuts in dividends.

In a similar vein, an unexpected increase in the dividend signals good news. Management will raise the dividend only when future earnings, cash flow and general prospects are expected to rise enough so that the dividend will not have to be cut later. A dividend increase is management's signal to the market that the firm is expected to do well. The shares react favourably because expectations of future dividends are revised upwards, not because the firm has increased its payout.

In both these cases, the share price reacts to the dividend change. The reaction can be attributed to changes in the amount of future dividends, not necessarily a change in dividend payout policy. This signal is called the *information content effect* of the dividend. The fact that dividend changes convey information about the firm to the market makes it difficult to interpret the effect of dividend policy of the firm.

The clientele effect

In our earlier discussion, we saw that some groups have an incentive to pursue low-payout (or zero-payout) shares.[1] Other groups have an incentive to pursue high-payout shares. Companies with high payouts will thus attract one group and low-payout companies will attract another.

These different groups are called *clienteles,* and what we have described is a *clientele effect.* The clientele effect argument states that different groups of investors desire different levels of dividends. When a firm chooses a particular dividend policy, the only effect is to attract a particular clientele. If a firm changes its dividend policy, then they just attract a different clientele.

What we are left with is a simple supply and demand argument. Suppose that 40 per cent of all investors prefer high dividends, but only 20 per cent of the firms pay high dividends. Here the high-dividend firms will be in short supply; thus, their share prices will rise. Consequently, low-dividend firms would find it advantageous to switch policies until 40 per cent of all firms have high payouts. At this point, the *dividend market* is in equilibrium. Further changes in dividend policy are pointless because all of the clienteles are satisfied. The dividend policy for any individual firm is now irrelevant.

The clientele effect on dividend policy is illustrated by the remarks made by John Childs of Kidder-Peabody (a USA investment bank) in the following exchange:[2]

Joseph T. Willet: John, you've been around public utilities for a good many years. Why do you think that utilities have such high dividend payout ratios?

John Childs: They're raising dividends so they can raise capital ... If you take the dividends out of utilities today, you'll never sell another share. That's how important it is. In fact, if a few major utilities (with no special problems) cut their dividends, small investors would lose faith in the utility industry and that would finish the sales of utility shares.

John Childs (again): What you are trying to do with dividend policy is to enhance and strengthen the natural interest of investors in your company. The type of shareholders you attract will depend on the type of company you are. If you're Genentech, you are going to attract the type of shareholders which have absolutely no interest in dividends. In fact, you would hurt the shares if you paid dividends. On the other hand, you go over to the other extreme such as utilities and yield banks' shares. There the shareholders are extremely interested in dividends, and these dividends have an effect on market price.

To see if you understand the clientele effect, consider the following statement: 'In spite of the theoretical argument that dividend policy is irrelevant or that firms should not pay dividends, many investors like high dividends. Because of this fact, a firm can boost its share price by having a higher dividend payout ratio.' True or false?

The answer is false if clienteles exist. As long as enough high-dividend firms satisfy the dividend-loving investors, a firm won't be able to boost its share price by paying high dividends. An unsatisfied clientele must exist for this to happen, and there is no evidence that this is the case.

Notes

1 A quick glance at Table 6.2 in Chapter 6 shows that about 50 per cent of the shares listed do not have dividends.

2 Joseph T. Willett, moderator. 'A Discussion of corporate policy', in *Six Roundtable Discussions of Corporate Finance with Joel Stern,* D.H. Chew (ed.) (Basel: Blackwell, 1986). The panellists included Robert Litzenberger, Pat Hess, Bill Kealy, John Childs and Joel Stern.

Real-world factors favouring a high payout

S. Ross et al.

Source: Ross, S., Thompson, S., Christensen, M., Westerfield, R. & Jordan, B. 2001, *Fundamentals of Corporate Finance,* 2nd Austn edn, Irwin, Sydney, pp. 618–20.

In this section, we consider reasons why a firm might pay its shareholders higher dividends even if it means that the firm must issue more shares to finance the dividend payments.

In a classic textbook, Benjamin Graham, David Dodd and Sidney Cottle have argued that firms should generally have high-dividend payouts because:

1. 'The discounted value of near dividends is higher than the present worth of distant dividends.'
2. Between 'two companies with the same general earning power and same general position in an industry, the one paying the larger dividend will almost always sell at a higher price'.[1]

Two factors favouring a high-dividend payout have been mentioned frequently by proponents of this view: the desire for current income and the resolution of uncertainty.

Desire for current income

It has been argued that many individuals desire current income. The classic example is the group of retired people and others living on a fixed income, the proverbial 'widows and orphans'. It is argued that this group is willing to pay a premium to get a higher dividend yield. If this is true, then it lends support to the second claim by Graham, Dodd and Cottle.

It is easy to see, however, that this argument is not relevant in our simple case. An individual preferring high current cash flow but holding low dividend securities could easily sell off shares to provide the necessary funds. Similarly, an individual desiring a low current cash flow but holding high dividend securities can just reinvest the dividend. This is just our homemade dividend argument again. Thus, in a world of no transaction costs, a high current dividend policy would be of no value to the shareholder.

The current income argument may have relevance in the real world. Here the sale of low dividend shares would involve brokerage fees and other transaction costs. Such a sale may also trigger capital gains taxes. These direct cash expenses could be avoided by an investment in high-dividend securities. In addition, the expenditure of the shareholder's own time when selling securities and the natural (but not necessarily rational) fear of consuming out of principal might further lead many investors to buy high-dividend securities.

Even so, to put this argument in perspective, it should be remembered that financial intermediaries such as mutual funds can (and do) perform these 'repackaging' transactions for individuals at very low cost. Such intermediaries could buy low-dividend shares and, by a controlled policy of realising gains, they could pay their investors at a higher rate.

Uncertainty resolution

We have just pointed out that investors with substantial current consumption needs will prefer high current dividends. In another classic treatment, Gordon has argued that a high-dividend policy also benefits shareholders because it resolves uncertainty.[2]

According to Gordon, investors price a security by forecasting and discounting future dividends. Gordon then argues that forecasts of dividends to be received in the distant future have greater uncertainty than do forecasts of near-term dividends. Because investors dislike uncertainty, the share price should be low for those companies that pay small dividends now in order to remit higher dividends at later dates.

Gordon's argument is essentially a 'bird-in-hand' story. A $1 dividend in a shareholder's pocket is somehow worth more than that same $1 in a bank account held by the company. By now, you should see the problem with this argument. A shareholder can create a bird in hand very easily just by selling some of the shareholdings. The choice is a current dividend or a current capital gain, not a current dividend or a future dividend.

Tax and legal benefits from high dividends

Earlier, we saw that dividends were taxed favourably for individual investors. This fact is a powerful argument for a high payout. However, there are a number of other investors who do not receive favourable tax treatment from holding high-dividend rather than low-dividend yield securities; for example, retirees who live off their dividends in low or zero tax brackets would not receive any benefits.

Corporate investors have always enjoyed an exemption from paying tax on dividend income. For the corporate investor dividend income is exempt while capital gains are taxed. As a result corporate investors prefer high dividend yield shares with low capital gains. The tax advantage of dividends also leads companies to hold high yielding shares instead of long-term debt because the interest received from the debt is taxed.

It has been pointed out that investors are attracted to the dividend policy that suits their individual tax situations; however, it is to be noted that many investors do not pay tax or their earnings are taxed at a low rate. This group includes some of the largest investors in the economy, such as superannuation funds, trust funds and endowment funds. Superannuation funds, which comply with specific conditions, are subject to tax at the concessional rate of 15 per cent on their income. These complying funds can take advantage of franking credits in respect of Australian dividends up to 15 per cent of their taxable income, so they need to select their portfolios to provide this level of franked dividend. If a company increases the level of dividend to provide a larger franking credit, it may not advantage this class of shareholders as the excess credits could not be used.

There are some legal reasons for some large institutions to favour high-dividend yields. First, institutions such as superannuation funds and trust funds are often set up to manage money for the benefit of others. The managers of such institutions have *a fiduciary responsibility* to invest the money prudently. It has been considered imprudent in courts of law to buy shares in companies with no established dividend record.

Second, institutions such as university endowment funds and trust funds are frequently prohibited from spending any of the principal. Such institutions might therefore prefer high-dividend yield shares so they have some ability to spend. Like widows and orphans, this group thus prefers current income. Unlike widows and orphans, this group is very large in terms of the number of shares owned.

Other large investors, for example superannuation funds who will have to meet large retiree payouts in 20 or 30 years, would require low current dividend cash flows and large capital gains to meet their future commitments. It can be seen that it is the overall obligations of the large institutional investors that will determine their dividend needs, not just the tax situation.

Notes

1 G. Graham, D. Dodd, & S. Cottle, *Security Analysis,* New York: McGraw-Hill, 1962

2 M. Gordan, *The Investment, Financing and Valuation of the Corporation,* Richard D. Irwin, Homewood, Illinois, 1961.

Real-world factors favouring a low payout

S. Ross et al.

Source: Ross, S., Thompson, S., Christensen, M., Westerfield, R. & Jordan, B. 2001, *Fundamentals of Corporate Finance,* 2nd Austn edn, Irwin, Sydney, pp. 613–8.

The example we used to illustrate the irrelevance of dividend policy ignored taxes and flotation costs. In this section, we will see that these factors might lead us to prefer a low-dividend payout.

Taxes

Australian tax laws are complex and the tax treatment of dividends paid by companies has consistently been the subject of debate and controversy. At the heart of discussions, prior to September 1985, was the issue of double taxation. Company profits were taxed and this was followed by taxation of dividends in the hands of shareholders. The only relief, until the September 1985 tax reform, had been that, under Section 46 of the *Income Tax Assessment Act*, company shareholders were allowed rebates of tax paid on dividend income. From September 1985 a dividend imputation system was introduced[1] which allowed some relief from the double taxation of company profits. As well as altering the taxation relating to dividends the 1985 changes affect the taxation of capital gains. Prior to 20 September 1985 capital gains tax applied to a narrow range of situations.[2] September 1985 saw the general imposition of capital gains taxation. Table 19.1 summarises the types of assets on which capital gains tax is levied at the marginal tax rate of the taxpayer. From 1 October 1999 the capital gain tax laws were changed to where one half of any gain (for an individual) is exempt from capital gains tax.

Table 19.1: Assets caught by capital gains tax

Assets caught

Capital assets purchased, constructed or acquired by way of a gift or inheritance after 19 September 1985.

Specified personal-use assets purchased, constructed or acquired by way of a gift or inheritance after 19 September 1985 (e.g. works of art, stamp collections, jewellery—items expected to appreciate).

Assets exempted

Capital assets purchased, constructed (or construction begun), or acquired before 20 September 1985.

Personal-use assets such as furniture.

Principal residence of a family unit and reasonable curtilage.

Motor vehicle (disposals).

Superannuation and life insurance policy proceeds.

Concessions in application

Capital gain can be rolled over where capital assets are subject to compulsory acquisition or loss or destruction and for certain business organisations.

Bodies currently exempt from income tax will also be exempt from a capital gains tax. They include Commonwealth and State Governments and some of their agencies, local government bodies, religious and charitable institutions, and approved deposit funds.

Table 19.2: Examples of imputed tax credits

Shareholders' level of taxable income	6,001 to 20,000	20,001 to 50,000	50,001 to 60,000	60,000 +
Marginal tax rate (1 July 2000)	17%	30%	42%	47%
Corporate tax	$30	$30	$30	$30
dividend paid	70	70	70	70
Taxpayer's additional assessable income*	$100	$100	$100	$100
Tax on assessable income	$17	$30	$42	$47
Credit for company tax	30	30	30	30
Net credit (payment)	$13	nil	($12)	($17)
Tax to be paid on dividends	($13)**	nil	$12	$17

* This amount is calculated by 'grossing up' the dividend received. The dividend is divided by one minus the corporate tax rate as: $70/1 – .3 = $100.

** From 1 July 2000 taxpayers can receive tax refunds for credits created by excess imputation credits prior to this date the excess credits were lost.

Imputation

The imputation system was designed to remove the problem of double taxation for resident individual taxpayers. The system results in the individual receiving a credit (imputation) for the tax actually paid by the company. Examples of shareholders imputed tax situations are presented in Table 19.2.

The method of calculating the assessable dividend income of the taxpayer is to regard the income of the company as falling directly into the shareholder's hands. The shareholder who receives a dividend of $70 would be regarded as earning assessable dividend income of $100 (the dividend of $70 plus the $30 tax paid by the company).

Consider the situation of a shareholder who receives a dividend of $70 and has taxable income at the $6001 to $20 000 level. The effect is that no personal tax is collected from the taxpayer on the dividend income and a net credit can be set off against tax on other income. From 1 July 2000 the credit can be collected as a tax refund prior to that date it was lost. The imputation credit available for the resident individual taxpayer must have been matched by a payment of a corresponding amount of tax by the company. Therefore it is necessary for companies to clearly identify dividends that are paid out of profits on which tax has been levied. These dividends are called *franked dividends.*

The imputation credit can be offset against income tax on the income of shareholders, whether the income is from dividends or other sources. The imputation systems affects only resident individual taxpayers. Company and non-resident shareholders do not benefit from the system.

For individual shareholders with other income sources the effective tax rates on dividend income are lower than the tax rates on capital gains. Consider the case of an individual earning in excess of $60,000 and incurring a marginal tax rate of 47 per cent. Dividend income will result in a marginal tax rate on the income equal to the marginal tax rate of the individual minus the tax rate of the company (that is 47% – 30% = 17%). As only half of the capital gains will be taxed the effective rate is 23.5 per cent. The tax on the capital gain can be deferred until the share is sold. This will lower the effective tax rate because the present value of the tax is less. For example, assume that the individual's expected rate of return is 12 per cent, then the question as to how long the capital gain has to be deferred may be presented as:

$$\begin{aligned} 17\% &= 23.5\% / (1.12)^n \\ (1.12)^n &= 1.3824 \\ n &= 2.858 \text{ years.} \end{aligned}$$

The benefit of dividend imputation does not necessarily mean there should be a policy of paying all funds out as dividends. Consider a firm that has four shareholders with equal holdings. The firm has earned taxable income of $4000, so that

Taxable income	$4000
Tax at 30%	1200
Available for dividends	$2800

Each shareholder will receive a fully franked dividend of $700. Table 19.3 provides details of the financial position of the four shareholders.

Table 19.3: Example of dividend effects on shareholders

Shareholders	A	B	C	D
Without dividend				
Cash income	$5,000	$15,000	$40,000	$61,000
Tax payable*	nil	2,550	12,000	28,670
Net cash flow (1)	$5,000	$12,450	$28,000	$32,330
With dividend				
Cash income	$5,000	$15,000	$40,000	$61,000
Assessable dividend income**	1,000	1,000	1,000	1,000
Total Assessable income	$6,000	$16,000	$41,000	$62,000
Tax payable*	nil	$2,720	$12,300	$29,140
Dividend tax credits	$300	300	300	300
Net tax payable	($300)	$2,420	$12,000	$28,840
Cash income	$5,000	$15,000	$40,000	$61,000
Plus dividend	700	700	700	700
	$5,700	$15,700	$40,700	$61,700
Less (plus) tax	(300)	2,420	12,000	28,840
Net cash flow (2)	$6,000	$13,280	$28,700	$32,860
Additional cash flow from dividend	$1,000	$830	$700	$530

* The tax payable has been derived using the rates shown in Table 19.2, 0% (A), 17% (B), 30% (C), 47% (D).

** The dividend ($700) plus the proportion of tax paid by the company on the profits that provided the funds for the dividend ($1,200 / 4 = $300).

The last line of Table 19.3 shows that the dividend will result in a different cash flow value for each shareholder. The different cash flows are a combination of the dividend plus the difference between the taxation paid by the company on the dividend and the personal tax that is levied on the imputed dividend. The calculation is:

	Company tax paid—personal tax	**+ Dividend**	
For Shareholder A	Tax refund of $300	+ $700	= $1,000
For Shareholder B	$300 – 20% of $1,000	+ $700	= $830
For Shareholder C	$300 – 30% of $1,000	+ $700	= $700
For Shareholder D	$300 – 47% of $1,000	+ $700	= $530

Obviously the dividend has a different value for the shareholders, but does this answer the question whether the dividend should be paid? The answer depends upon what effect keeping the funds has on the value of the firm. If the firm keeps the dividend and it can use the money in profitable investments, the value of the firm must increase. In order that shareholders may use the funds generated by the increase in value, it will be necessary for them to sell shares. Capital gains tax may have to be paid on any profit arising from the sale. For example, if keeping the fund increased the value of the firm by only 2,800 all the shareholders would prefer the dividend. As each shareholding will increase by $700 and when it is realised capital gains tax will have to be paid on $350 (half of $700). Readers may work through a table similar to 19.3 to show the net cash flow if we substitute the capital gain for the dividend is:

	Net cash flow	**Comparison to dividend payment**
Shareholder A	$5,700.00	less $300.00
Shareholder B	$13,090.00	less $189.50
Shareholder C	$28,595.00	less $105.00
Shareholder D	$32,865.50	less $5.50

This simple example highlights the important element of the decision on dividend policy. The most important consideration is what the firm can do with the funds retained. Will holding the funds in internal projects enhance the value of the firm? The objective of the firm is to increase the value of the owners' shares. In some situations shareholder tax rates will make higher franked dividends very attractive. In other shareholder cases, it will be preferred if the company does not pay a dividend. The optimal dividend policy for the firm will be determined by the market interaction of all these different shareholder situations.

In a competitive market situation the dividend policy of the firm does not matter. The important determination is the investment program of the firm. Once this program is determined it can be financed internally by withholding dividend or externally through a share issue or by borrowing. If the company feels it has to pay a dividend, and funds are not available from operations to finance investment and pay the dividend, it can make a share issue or it can borrow to cover the investment.

Flotation costs

In the argument that dividend policy does not matter, we saw that the firm could sell some new shares if necessary to pay a dividend. As we mentioned in Chapter 17, selling new shares can be very expensive. If we include flotation costs in our argument, then we will find that the value of the firm decreases if we sell new shares.

More generally, imagine two firms that are identical in every way except that one pays out a greater percentage of its cash flow in the form of dividends. Since the other firm ploughs back more, its equity grows faster. If these two firms are to remain identical, then the one with the higher payout will have to sell some shares periodically to catch up. Since this is expensive, a firm might be inclined to have a low payout.

Dividend restrictions

In some cases, a corporation may face restrictions on its ability to pay dividends. For example, as we discussed in Chapter 15, a common feature of a debenture trust deed is a covenant prohibiting dividend payments above some level.

Notes

1 The imputation system was publicly announced in September 1985; however, the legislation introducing it did not take effect until 1 July 1987.

2 For example, Section 26AAA of the *Income Tax Assessment Act 1936* (this section was maintained after September 1985) was drafted to catch short-term property sales. Section 25A (this section was deleted after September 1985) was designed to catch profit made from the sale of property acquired for the purpose of profit making as opposed to income-producing property.

Dividend reinvestment plans: The good news keeps coming

Lucinda Schmidt

Source: Schmidt, L. 1994, 'Dividend reinvestment plans: The good news keeps coming', *Business Review Weekly,* 19 Sept., pp. 120–1.

Companies that plugged the virtues of their dividend reinvestment plans when they needed the cash are quietly dropping them now their balance sheets are recovering. Pacific Dunlop, Westpac, Boral, Mayne Nickless, Brambles, BTR Nylex, Western Mining Corporation and Amcor are just some of the companies that have suspended their plans recently.

A dividend reinvestment plan allows shareholders to swap cash dividends for extra shares, which are issued at a discount to the market price of 5–10%. Another attraction is that there are no brokerage, stamp duty or other transaction costs. For investors who don't need the income from cash dividends, the plans are a cost-effective way of increasing their shareholding every six months and maximising capital growth.

Reinvestment plans are enormously popular; commonly about 45% of shareholders in large listed companies participate. Companies have been enthusiastic about them, too; the number of plans offered has risen from 35 a decade ago to more than 150 last year. The attraction for companies is cash—they can retain it instead of paying it out in dividends. The disadvantage is that every extra share issued through the plans increases the company's capital and so dilutes the value of the shares.

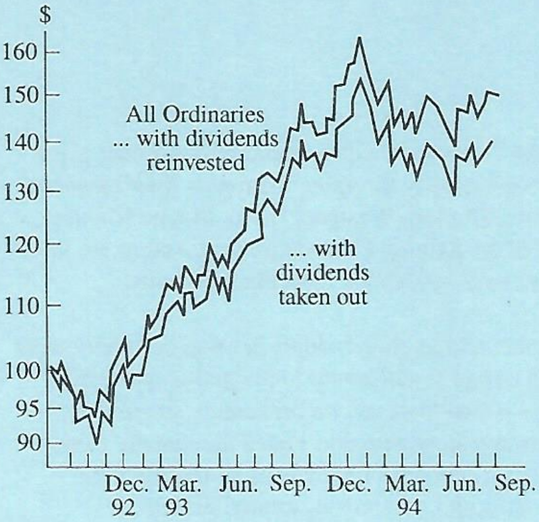
The problem is that reinvestment plans have become too popular, at a time when many companies don't need the extra cash. Michael Heffernan, the Australian Stock Exchange's chief economist, says the plans supplied listed companies with more than $3.3 billion last financial year, 14.5% of the total amount of capital raised on the market. Two of the biggest were BHP and the National Australia Bank; BHP's plan added $114.7 million to the company's coffers after its January interim dividend, and $187 million was retained by the National Australia Bank after its February dividend.

But shareholders who have watched as their investment multiplies through a dividend reinvestment plan should not despair if the plan is dropped. Brokers are urging investors to see the suspension of reinvestment plans in a positive light, arguing that this will lead to higher earnings per share and ultimately lift share prices. This view seems to have been well accepted by the larger institutional investors, but small investors have yet to be converted.

Helen Breier, a private-client adviser with Bain Securities, warns shareholders against jumping to the conclusion that they are being 'robbed' by companies that drop their reinvestment plans. 'It is not as simple as that,' she says. 'You have to look at the reasons why the DRP is there in the first place: to raise capital.

'Whenever you raise capital, you dilute your shareholding—that is the negative thing. Companies have been willing to wear that (with their reinvestment plans) because they wanted to raise cheap capital. But with low interest rates and stronger balance sheets, companies no longer need to raise money in this way. Circumstances have changed so companies have to change; it is silly to raise funds they don't need.

The value of reinvestment



Source: Knight-Rider Equinet.

'This is good for shareholders because there is no dilution (of the value of the shares they already have). The company's balance sheet and earnings are going to look better and eventually this will be fed back to shareholders through higher dividends and capital growth. The interests of the shareholders and the company are one and the same.'

Breier believes shareholders should see reinvestment plan suspensions as a positive move. 'Don't look at it as the company taking something away; think of it as the company taking a different tack. I would be very concerned if I thought a company was keeping up its plan just because it was popular, rather than looking at the long-term interest of the company.'

Another private-client adviser, Ross Illingworth of Potter Warburg, also believes the suspensions are good for small investors. Like Breier, he stresses that companies must have a need for the extra cash generated by the plans. 'They've got to use those funds to boost earnings,' he says. 'If they don't, it dilutes earnings and that is not in the best interests of the shareholders.'

Illingworth says DRPs are management tools, not an automatic right of shareholders. 'Shareholders have to get used to the fact that it is a way of companies conserving cash. Reinvestment plans will be turned on and off as needed. They should not think of the suspensions as penalties, but as directors acting in the best interests of the company. At the end of the day it is the shareholders who are going to get the returns.'

How a DRP Works

Company XYZ pays a final, fully franked dividend of 4 cents a share on 30 May, 1994. At the books' closing date, John Smith has 10 000 shares in the company and has decided that 5000 of them will participate in the company's dividend reinvestment plan.

The amount for reinvestment is $200, that is, 5000 shares multiplied by 4 cents a share dividend. Assuming the current market price of Company XYZ shares is $2, and the allowable discount is 10%, the DRP share price is $1.80.

Share entitlement:

$$\frac{\text{Amount available for reinvestment}}{\text{Market price per share} - \text{discount}}$$

$$= \frac{\$200.00}{\$1.80}$$

= 112 shares (rounded up)

Source: ANZ McCaughan Dividend Handbook 1994.

Illingworth says that reinvestment plans have not been a hit for all shareholders. Many overseas investors, including Americans, are unable to participate because of regulations in their own countries. When new shares are issued through the plan, the foreign-owned shares are diluted, without any opportunity for the foreign shareholders to buy the cheap shares themselves. There are also administrative hassles: the plans often generate odd lots of extra shares that are difficult to sell, and the record-keeping required for tax purposes is fairly time-consuming.

The other thing for private investors to bear in mind is that they don't need a company plan to reinvest their dividends: the cash payout can be used to buy more shares through a broker. Although this option involves more costs (brokerage, stamp duty and no discount to the market price) these may be offset by the investor being able to pick when to buy. There is also more flexibility with stock selection: the dividends from one company can be used to buy shares in another.

Buybacks boom

James Thomson

Source: Thomson, J. 2001, 'Buybacks boom', *Business Review Weekly*, 2 March, p. 40.

A scheme that can improve the fortunes of companies as well as investors is gaining popularity

The latest sport on the Australian Stock Exchange is picking the next share buyback. With more than eight companies launching buybacks in the past two months and another five expected in the next few months, buybacks are in fashion.

A share buyback allows a company to buy back a percentage (usually 5–10%) of its own stock, which it then cancels. With fewer shares, the earnings per share and return on equity increase. So too, in many cases, does a company's share price: on October 13 last year, the Woolworths share price leapt 34c to a record high of $7.52 when the company announced a $200-million buyback. In February this year, St George Bank shares hit a record high of $14.75, up 58c, after it announced a $375-million buyback.

In the past 12 months, more than 27 companies launched buybacks with a combined value of $4.5 billion. This year, the number is likely to increase slightly, with a combined value of more than $6 billion. Commonwealth Bank has launched a $700-million buyback and BHP will go into the market for 90 million of its shares, worth up to $1.7 billion. But it is no longer just big companies that are getting into the share buyback frenzy. Capral Aluminium, for example, has launched a $310-million buyback.

Why the sudden interest in buybacks? The 1989 Co-operative Scheme Legislation Amendment Act enabled Australian companies to buy back shares, but it was not until the law was simplified in 1995, so that auditor reports were no longer needed and the liability of directors was reduced, that companies began to embrace the concept. Changes to capital gains tax (CGT) have also increased the number of buybacks.

After the Ralph committee review of business taxation, CGT on assets held for more than 12 months was cut from 48.5% to 24.25% for investors on the top marginal tax rate. Companies usually issue shareholders a special dividend to return the proceeds of an asset sale, but these dividends are taxed at an individual's full marginal income tax rate. A shareholder participating in a buyback pays the reduced CGT tax rate, which is a lesser amount in most cases.

Companies are using buybacks for capital management. UBS Warburg director Karen Phin says: 'It is simply a mechanism under which a company can improve its financial structure in the event it has surplus capital and no current use for that surplus capital.' Phin has supervised several buybacks, including the $1.8-billion Lend Lease buyback last year after the company sold the financial planning firm MLC to National Australia Bank for $4.6 billion.

Companies can buy their shares on the market like any other investor, or off-market by giving shareholders the chance to sell some or all of their shares back to the company. An on-market buyback allows a company to go into the market when its shares are low, thereby ensuring maximum value to shareholders. An off-market buyback allows all shareholders an equal chance to participate in the process and returns value to them more directly.

Phin says CGT is making companies and shareholders rethink the value of dividends. 'As people understand the structure, we are seeing more of buybacks. People are happier to participate once they know the benefits.' She says the importance of dividends may decrease as shareholders become used to having value returned to them through a buyback.

Although most companies try to find an acquisition target before launching a buyback, there is a danger that a new opportunity will emerge while the company is in the process of reducing its capital. Foster's Brewing Group was forced to stop its buyback in August last year when it decided to buy the United States wine company Beringer Wine Estate Holdings.

Company executives with option packages linked to the performance of a share price also benefit from buybacks. A buyback often triggers a share price rise that can make the director's options exercisable. The executive officer of the Australian Shareholders Association, Tony McLean, says his organisation will be scrutinising buybacks to ensure they occur only when it is in the best interests of a company and its shareholders.

Phin says there is a danger that some companies will suggest a buyback because it is 'in fashion', and she warns that, although a buyback may push up the share price for a short time, it will not solve any long-term problems. 'It is certainly not a magical tonic. Unless the buyback is announced in conjunction with operating initiatives for further earnings growth, and unless management has the confidence of the market, any share price appreciation that is simply due to the buyback will simply disappear after it is completed.'